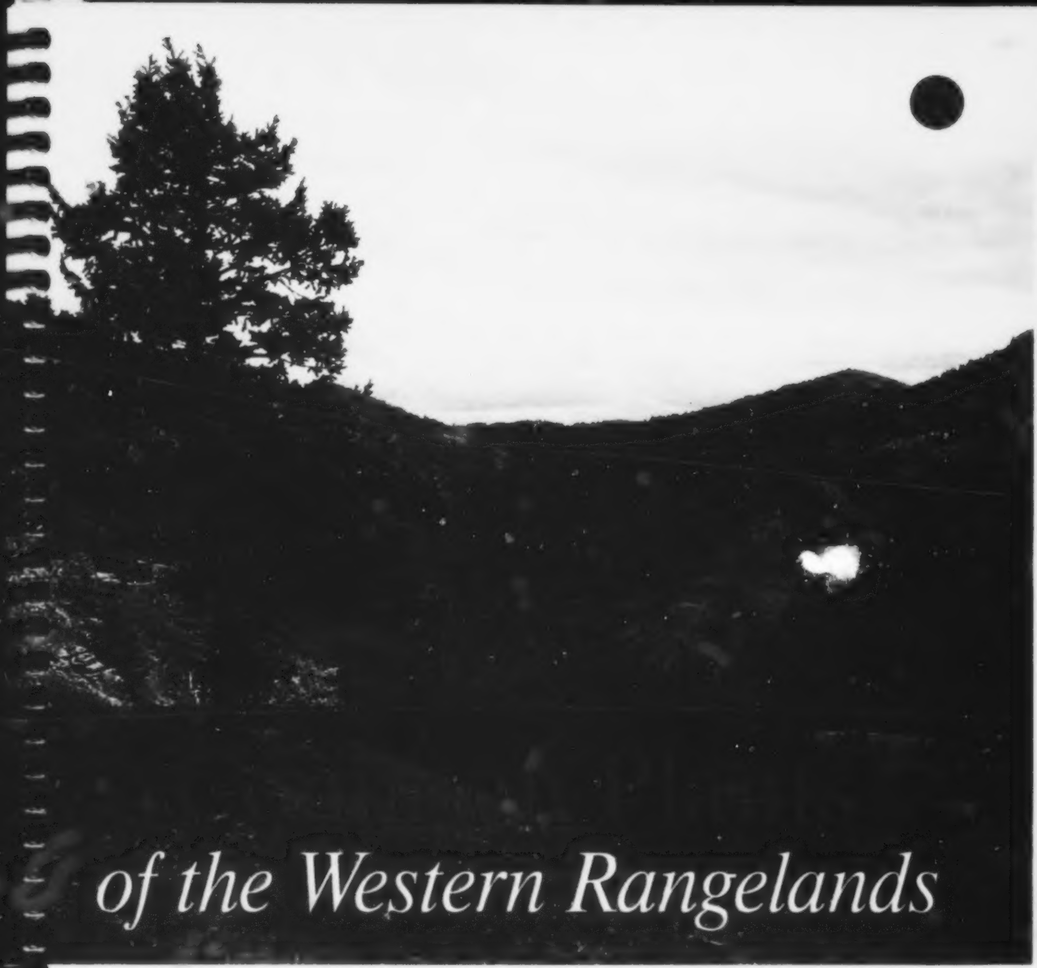


# of the Western Rangelands

Volume 2
Trees and Shrubs

OLDS COLLEGE

Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

Common Plants
of the Western Rangelands

Volume 2
Trees and Shrubs

Kathy Tannas

OLDS COLLEGE

Alberta
AGRICULTURE, FOOD AND
RURAL DEVELOPMENT

Disclaimer

Her Majesty the Queen in the Right of Alberta ("Her Majesty") and Olds College (the "College") make no warranty, expressed or implied, nor assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information contained in this publication, nor that use thereof will not infringe on privately owned rights. The views and opinions of the author expressed herein do not necessarily reflect those of Her Majesty or the College. Her Majesty, her officers, employees, agents and consultants and the College, its officers, employees, agents and consultants are not responsible or liable for damage, injury or costs, howsoever caused, to any person in connection with or arising out of the use by that person for any purpose of this publication or its contents.

Copies of this book are available from:

Alberta Agriculture, Food and Rural Development
Publications Office
7000 113 Street
Edmonton, Alberta, Canada T6H 5T6
Toll free phone (Canada only) 1-800 292-5697
Phone: (780) 427-0391

Copyright 2003. Her Majesty the Queen in the Right of Alberta, Olds College and Kathy Tannas.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical photocopying, recording or otherwise without written permission from the Information Packaging Centre, Alberta Agriculture, Food and Rural Development.

ISBN 0-7732-6160-5

104-03571/

Acknowledgments & Credits

First Edition, *Common Plants of the Western Rangelands* published by Lethbridge Community College.

I would like to especially thank Ray Gesshe and Sylver Smoliak for their time, patience and expertise in helping edit the text.

Thank you to my husband, Clare, for participating as a consultant.

Also thank you to those who supported my efforts and who helped with design and layout:
Barry Adams
Oriano Castelli
Harry Cornwell
Joyce Gould
Rick Sullivan
Shane Porter
Walter Willms

Second Edition prepared by Olds College, published by Alberta Agriculture, 2003.

Thanks to all who have shared my vision of expanding the texts, also those contributing professional and financial support:
Ray Gesshe, Olds College
Scott Reid, Alberta Agriculture
Bonnie Rice, Olds College
Lisa Pohl, Olds College
Sherrill Strauss, Alberta Agriculture

It is also imperative to recognize the dedication and contributions of taxonomists and rangeland scientists over past decades. These individuals lay the foundations in botany and rangeland studies, and have made it possible for those of us currently in this field to work much more efficiently and effectively.

Final Edit: Kathy Tannas

Illustration Credits

With the exception of those listed below, the illustrations in this book are reproduced from *Vascular Plants of the Pacific Northwest, Parts 1- 5*. Hitchcock, C.L., et al. University of Washington Press, 1955-69. Reproduced with the permission of the University of Washington Press.

Illustrations of *Pinus banksiana, Abies balsamea, Salix serissima, Salix maccalliana*, and *Salix discolor* are from *Plants of the Western Boreal Forest and Aspen Parkland*. MacKinnon, Andy; Jim Pojar and Ray Coupe. Edmonton: Lone Pine Publishing, 1995. Reproduced with permission of James Pojar, British Columbia Forest Service.

Illustrations of *Larix laricina, Picea mariana, Salix arbusculoides, Salix glauca* and *Vaccinium vitis-idaea* are from *Alaska Trees and Shrubs*, USDA Forest Service Agriculture Handbook No. 410. Viereck, L.A. and E.L Little. Washington D.C.: United States Department of Agriculture, Forest Service, 1972.

Illustration of *Corylus cornuta* is from *Budd's Flora of the Canadian Prairie Provinces*. Budd, A.C., J. Looman and K.F. Best. Research Branch, Agriculture and Agri-Food Canada, 1979. Reproduced with the permission of the Minister of Public Works and Government Services Canada.

Illustrations of *Arctostaphylos rubra* and *Rubus chamaemorus* by Dagny Tande Lid are from *Biological Series No. 50, Bulletin 146: Illustrated Flora of the Canadian Arctic Archipelago*. Canadian Museum of Nature, 1957. Reproduced with permission of the Canadian Museum of Nature.

The illustration of *Vaccinium myrtilloides* is from *Field Guide to Forest Ecosystems of West-Central Alberta*. Corns, I.G.W. and R.M. Annas. Northern Forestry Centre, Canadian Forestry Service, 1986. Reproduced with the permission of the Minister of Public Works and Government Services Canada.

The illustration of *Salix pyrifolia* is from *Plants of Northern British Columbia*. Johnson, Derek, et. al. Edmonton: Lone Pine Publishing, 1992 . Reproduced with permission of James Pojar, British Columbia Forest Service.

The illustration of *Spiraea alba* is from *Northern Range Plants* Store, C. and D. Lawrence. Edmonton: Public Lands Division, Government of Alberta, 2000.

The illustration of *Crataegus rotundifolia* is from *A Habitat Field Guide to Trees and Shrubs of Alberta*. Wilkinson, Kathleen. Edmonton: Lone Pine Publishing, 1990. Reproduced with the permission of Joan Williams, J. Williams Consulting.

The illustration of *Salix petiolaris* is an original produced by Lori Reid for this project.

Table of Contents

Introduction 1

Willow Illustrations 12

Trees and Shrubs Keys 14

CUPRESSACEAE - Cypress Family 17

JUNIPERUS L. - Juniper 17

PINACEAE - Pine Family 20

LARIX Adans. - Larch 21

PICEA A. Dietr. - Spruce 24

PINUS L. - Pine 29

PSEUDOTSUGA Carr. - Douglas Fir 33

SALICACEAE - Willow Family 35

POPULUS L. - Poplar; Cottonwood 35

SALIX L. - Willow 42

BETULACEAE - Birch Family 79

ALNUS Hill. - Alder 79

BETULA L. - Birch 83

CHENOPODIACEAE - Goosefoot Family 87

ATRIPLEX L. - Orache; Saltbush 87

EUROTIA Adans. - Winter Fat; White Sage 90

SARCOBATUS Nees - Greasewood 92

BERBERIDACEAE - Barberry Family 93

GROSSULARIACEAE - Currant/Gooseberry Family 94

RIBES L. - Currant; Gooseberry 94

ROSACEAE - Rose Family 102

AMELANCHIER Medic. - Service-berry; Saskatoon 103

DRYAS L. - Dryad; Mountain Avens 106

POTENTILLA L. - Cinquefoil 109

PRUNUS L. - Plum; Cherry 111

ROSA L. - Rose 114

RUBUS L. - Raspberry; Dewberry 118

SORBUS L. - Mountain Ash 124

SPIRAEA L. - Meadowsweet; Spiraea 126
ACERACEAE - Maple Family 129
CELASTRACEAE - Bittersweet Family 131
RHAMNACEAE - Buckthorn Family 132
CACTACEAE - Cactus Family 134
OPUNTIA Mill. - Cactus ; Prickly Pear 134
ELAEAGNACEAE - Oleaster Family 137
ELAEAGNUS L. - Oleaster 137
SHEPHERDIA Nutt. - Buffalo-berry 140
ARALIACEAE - Ginseng Family 143
OPLOPANAX (T. & G.) MIQ. - Devils-club 143
CORNACEAE - Dogwood Family 144
CORNUS L. - Dogwood 144
ERICACEAE - Heath Family 146
ARCTOSTAPHYLOS Adans. - Bearberry 146
LEDUM L. - Labrador Tea 149
RHODODENDRON L. - Rhododendron 151
VACCINIUM L. - Blueberry; Huckleberry; Cranberry 153
CAPRIFOLIACEAE - Honeysuckle Family 159
LONICERA L. - Honeysuckle 161
SYMPHORICARPOS Duhamel - Snowberry; Buckbrush 164
VIBURNUM L. - Bush Cranberry 167
COMPOSITAE - Composite Family 169
ARTEMISIA L. - Wormwood; Sagebrush 169
CHRYSOTHAMNUS Nutt. - Rabbit-brush 172
Index 173
Glossary 178
References 191

Salix: An Intriguing and Perplexing Genus

For the purpose of simplification in many vegetation and habitat studies, the "a willow is a willow" statement has, in many cases, been acceptable; forage value of the genus as a whole is good, and most species, although competitive increasers, provide important wildlife habitat and are crucial to the preservation of riparian habitats. Any efforts to further "fine tune" relative palatability from one species to the next is often of only limited success.

One difficulty in determining specific forage values lies in the fact that, taxonomically, willows are one of our most difficult groups. A further complication, unique to only a few of our challenging genera, is the frequent hybridization between species. In fact, in healthy shrub communities where several willow species occur, hybridization is the rule rather than the exception. This, in turn, interferes with palatability ratings and, instead, often leaves many questions unanswered. As well, it is always a number of variables in combination that will determine severity of browsing on a given species in a specific locality. These factors include climatic variation, snowfall accumulations, accessibility of the sites, plant height, abundance of alternate choice browse such as dogwood and saskatoon, and overall forage production as correlated to game and livestock population trends and distribution patterns. It is typical, then, to find one species heavily and consistently utilized in one situation and rather lightly used under different environmental conditions.

Despite these inconsistencies, some generalizations can be made, based on field observations and hedging class data. One pattern that does appear to emerge is that species with soft, often hairy foliage and first-year growth rate more highly than those with stiff, smooth leaves and twigs. Two rather broad groups are recognized:

Most Palatable Species
S. arctica
S. bebbiana
S. glauca
S. pseudomonticola
S. maccalliana
S. discolor
S. scouleriana
S. farriae
S. candida
S. barrattiana
S. lutea
S. brachycarpa

Somewhat Less Palatable Species
S. lucida
S. petiolaris
S. planifolia
S. pedicellaris
S. vestita
S. myrtillifolia
S. melanopsis
S. arbusculoides
S. drummondiana
S. amygdaloides
S. pyrifolia
S. exigua
S. serissima

Contributions by *Salix* species to the environment move beyond those of provision of habitat and forage. Although aggressive by nature and capable of displacing and reducing production of important herbaceous range species, they are recognized as playing a crucial role in stabilizing and maintaining riparian habitats. In the absence of the encroachment of larger deciduous and conifer species in many of these communities, willows will often persist as part of stable climax ecosites rather than representing only a temporary early phase in the dynamics of the successional process. In a number of these ecosite types, such as in sedge / willow fens and meadows along streams, carrying capacities of both the herbaceous and shrub layers can be relatively high and remain so, provided grazing and browsing pressure is not excessive.

Moisture and Soil Nutrient Regimes as Related to Willow Identification

As a general rule of thumb, any significant occurrence of willows can often be correlated to relatively rich, moist environments. Upon closer examination, however, it is apparent that there is considerable variation from one species to the next in terms of specific habitat requirements and tolerances. It follows, then, that identification of a species can sometimes be made more easily by focusing on the various factors (moisture regime, soil texture, soil nutrients etc.) that are used to define a range or ecosite type. It is unlikely, for example, that a low growing willow in a calcareous fen would be *S. bebbiana*, just as a tall, tree-like species on an upland montane slope would be *S. exigua*.

In the following table, common willow species are categorized, starting with those found most frequently on rich, mesic upland sites, and moving toward species typically of hygric shores, and finally those of nutrient-poor bogs. An attempt has also been made in the key beginning on page 42 to place individual species in an environmental context as well as the more traditional approach that focuses primarily on physiological characteristics.

Species	**Moisture/Nutrient Regimes, Habitat**
S. bebbiana	mesic, upland, rich soils
S. discolor	mesic-subhygric, upland/shores, rich
S. petiolaris	mesic-subhygric, upland/shores, rich
S. scouleriana	mesic-subhygric, upland/shores, medium
S. vestita	mesic-subhygric, montane-alpine
S. arctica	mesic-subhygric, montane-alpine
S. barrattiana	mesic-subhygric, montane-alpine
S. lucida	subhygric, upland/shores
S. pseudomonticola	subhygric-hygric, upland/shores, medium/rich
S. lutea	subhygric, upland/shores
S. drummondiana	subhygric-hygric, shores
S. serissima	subhygric-hygric, shores

S. amygdaloides	subhygric-hygric, shores
S. pyrifolia	subhygric-hygric, moist woods to muskegs
S. planifolia	subhygric-hygric, shores, medium /rich
S. exigua	subhygric-hygric, shores
S. melanopsis	subhygric-hygric, shores
S. glauca	subhygric-hygric, shores/wet woods, medium/poor
S. farriae	hygric-subhydric, shores/wet woods, medium/poor
S. arbusculoides	hygric-subhydric, shores/wet woods, medium/poor
S. maccalliana	hygric-subhydric, shores/wet woods, medium/poor
S. myrtillifolia	hygric-subhydric, bogs/wet acid woods
S. brachycarpa	hygric-hydric, bogs/fens/shores
S. candida	subhydric-hydric, bogs/fens, medium/poor
S. pedicellaris	subhydric-hydric, poor acid/calcareous bogs/fens

Keys in this text deal with only characteristics found in unhybridized, parent material as the variations and "plastic" nature of hybrids makes writing of keys nearly impossible for intermediate specimens.

Even within a given taxonomic entity what would appear to be "pure" specimens can show a great deal of physiological variation from one region to the next. Yellow willow (*S. lutea*), for example, shows these inconsistencies as United States specimens are compared to those in southern Alberta, just as shining willow (*S. lucida*) can vary even in a relatively small geographical area, southern boreal and southern foothills specimens often quite dissimilar.

Introduction

The content as well as style and format of this book have been designed for all those with an interest in the plants that occupy our western rangelands - students, professional staff, ranchers and farmers, as well as the amateur botanist whose interest is purely recreational.

Plant Identification Component

An attempt has been made to simplify terminologies used to describe and identify the various plant species, but, at the same time, to include enough taxonomic detail to adequately separate one species from the next. To accomplish this, a number of strategies were combined - the use of bold print to "short-cut" identification, thus emphasizing only key identifying characteristics; the addition of line drawings as visual aids; the simplification and inclusion of habitat/distribution considerations in plant keys. This process of simplification created the problem of where to "draw the line" in eliminating certain species from the text. With something like 1800 vascular plants in Alberta alone, it was necessary to focus only on those species most commonly encountered in our rangelands. These include, in some cases, those that dominate in a single ecoregion but are rarely found elsewhere, and alternately, plants that seldom form dominant cover but have a widespread distribution throughout all ecoregions. In addition to the native species composition, a number of non-native plants have been described. Many of these are important forage species, others are very aggressive and are either currently threatening our rangelands, or have the potential to do so. By necessity, difficult groups - sedges, rushes, willows - were given less emphasis, with only the most well known and widespread species receiving mention (complete species lists and descriptions for the various ecoregions can be found in a number of complete taxonomic texts).

Habitat and Distribution Component

In this component, each species is assigned to the ecoregion(s) where it is most commonly encountered, and its typical habitat is identified. It is within this second, or habitat, category that correlations can often be made between an individual species and an ecosite type (or successional phase). When this relationship between a species and its habitat is consistent and predictable, it is known as an indicator of a specific ecosite. The presence of black spruce/ Labrador tea, for example, indicates a more or less hygric, acidic site, whereas significant cover of kinnikinnick/buffalo-berry in western regions reflects a subxeric moisture regime. Conversely, in the case of difficult genera such as sedges and willows, ecosite characteristics can become a tool to verify a plant species' identity by incorporating habitat clues into a key. By using this species association technique, a sedge such as *Carex vaginata* would be associated with a hygric (often Labrador tea) community, just as *Carex stenophylla* or *siccata* reflect a subxeric environment.

Forage Value/Grazing Response/Notes Component

The primary purpose of the "Forage Value" section is to discuss the value of each plant species to livestock and wildlife. The value of a given species may vary, depending upon a number of factors such as season of use, habitat and availability and abundance of alternative forage. Thus, while relished by livestock in one area, the same species may be utilized sparingly when growing in another plant community. The term "Grazing Response" can be defined as the reaction of a given species when it is grazed. Although generalizations as to grazing response can usually be made, this reaction can sometimes vary from one microclimate and soil zone to the next. Thus, a plant may be an increaser in one region, but tend to decrease under a different combination of environmental conditions.

The final "Notes" component, by intention, is very brief, highlighting economic, aboriginal and medicinal uses of the plants. As well, most species are discussed briefly in terms of their importance in providing ground cover, potential for erosion control and any aesthetic appeal they may have.

The rangelands represented in this text are an intricate complex of plant communities, each of these a unique combination of grass and grass-like, forb and shrub species. The complexity in vegetation composition varies significantly from one area to the next. In the prairies, for example, it can be very simple, comprised of three or four major grasses and a few forbs, and will remain fairly stable and predictable until a major change in range type occurs. On the other extreme, such as can be found in the lush grasslands of the foothills region, it is not uncommon to encounter 35 or more species in a 100 metre, vegetation transect, and this specific composition changing considerably throughout a relatively small geographical area.

Grasses/Grass-like Species

Grasses are by far our most valuable forage plants, in well managed pastures comprising up to 90 per cent of the total grazing. Many are highly palatable, and their decrease in vigor and prominence correlates to deterioration in range condition. Bunch grasses, in particular, are sensitive to over utilization. They lack the option to reproduce vegetatively to any extent, and many, although producing abundant leafy growth, are poor seed producers. Grass-like species on the other hand, although members of large and diverse families, generally provide relatively small amounts of forage. Certain sedges and rushes are palatable, and in some localized situations, do rate among the most prominent species, and as such, are of some significance.

Forbs

Forbs are the best known and most easily identified members of the plant kingdom. From a rangeland perspective, however, most produce inferior quantities of forage, also do not have the curing properties characteristic of many native grasses. Most forbs increase with grazing pressure, their abundance an indicator of deteriorated range condition. Contained within this group are a number of species toxic to livestock. With the exception of larkspur, most of these are unpalatable and seldom ingested in any quantity under normal conditions. Also important are members of the legume family, most of which have the ability to fix atmospheric nitrogen. Some legumes produce large amounts of nutritious forage, others are poisonous, thus considered undesirable range species.

Trees and Shrubs

Trees and shrubs vary greatly in prominence from one ecoregion to the next. In the prairie region, they usually comprise a very small percentage of the vegetation cover, in other ecoregions form a large part of the plant community. Forage value also varies greatly, a few known to be toxic, many unpalatable and worthless to livestock and game, others highly nutritious and palatable, often relied upon exclusively as winter forage. In all ecoregions, shrub and tree components are valued as cover and habitat for wildlife. As a whole, woody species are persistent and relatively aggressive, thus have the potential to increase as range condition deteriorates.

The Ecoregions

Rangelands, by definition, are those areas which are conducive to utilization by livestock and game. Although most ecoregions provide forage and habitat to some extent, this text deals with primary and secondary rangelands, thus eliminating peripheral regions in the extreme north as well as alpine areas.

Within our western rangelands, six major ecoregions will be discussed, their boundaries determined by environmental and ecological means rather than by political. Definition of these boundaries can be somewhat obscure, with transitional vegetation zones and exceptions to the rule not uncommon occurrences. For example, growing side by side on a bank in south Calgary are both plains rough fescue (*Festuca hallii)* and foothills rough fescue (*Festuca campestris)* both distinct and without apparent hybridization. Blue grama *(Bouteloua gracilis*) can be found in abundance on exposed, sandy slopes in the foothills region, needle and thread (*Stipa comata*) and Indian rice grass (*Oryzopsis hymenoides*), although primarily species of the prairies, are present in all ecoregions on suitable sites.

Within each region, numerous range sites, or ecosite types, can be identified, each of these with its own unique indigenous vegetation community which is best adapted to the specific climate and soil conditions. Over time, the natural process known as plant succession occurs, and the pioneer species that dominate initially will be replaced by climax vegetation. This perfect or "bench mark" plant community that develops, unless disturbed or abused, remains relatively stable and self-sustaining. Within a given rangeland, various successional stages can usually be recognized, influenced by such factors as uneven livestock and game distribution patterns, mechanical disturbance and natural occurrences such as fire and flooding. The result is a complex mosaic of plant communities and a highly diverse ecosystem. In cases where prolonged and excessive abuse or disturbance has negatively impacted soil conditions and depleted the seed supply, this successional process can proceed very slowly. With less severe disturbance, natural succession can develop relatively quickly.

1. The Prairie Region

The prairie occurs in the Brown soil zone of southeastern Alberta and adjacent areas eastward and to the south, also in the drier portions of the Dark Brown soil zone in these regions. Most productive soils are predominantly Chernozemic, the primary factor limiting plant growth in this area is the low annual precipitation (averaging about 300 millimetres). As well, atmospheric temperatures are higher than in the other mentioned ecoregions. In the driest sites, upland grasslands are dominated by low growing, drought resistant species - needle and thread (*Stipa comata*), June grass (*Koeleria macrantha*), blue grama (*Bouteloua gracilis*) and such forbs as moss phlox (*Phlox hoodii*) and scarlet mallow (*Sphaeralcea coccinea*). Northern wheat grass (*Agropyron dasystachyum*) occupies the drier sites, western wheat grass (*Agropyron smithii*) preferring slightly moister and alkaline/saline habitats.

A common range type found in this ecoregion consists of Solonetzic soils, where hard clays restrict water absorption and root penetration. Species common on these sites are tolerant of moderate salt and alkali accumulations (for example, Sandberg bluegrass - *Poa sandbergii*, Nuttall's alkali grass - *Puccinellia nuttalliana*, and gumweed - *Grindelia squarrosa*). More highly saline and alkaline situations are frequent around sloughs and lakes, and vegetation composition is limited to a few species adapted to these extreme conditions (i.e. salt grass - *Distichlis stricta*, prairie bulrush - *Scirpus paludosus*, and samphire - *Salicornia europaea*).

Sandy Regosolic soils, often producing rolling landscapes, are common throughout the prairies. Grasses such as Indian rice grass (*Oryzopsis hymenoides*) and sand grass (*Calamovilfa longifolia*) dominate, and shrub cover is often higher due to increased potential for root penetration and/or an elevated water table. Badland breaks, often calcareous by nature, support species like plains muhly (*Muhlenbergia cuspidata*) and thread-leaved sedge (*Carex filifolia*), and higher moisture regimes are transitional to such grasses as green needle grass (*Stipa viridula*) and western porcupine grass (*Stipa curtiseta*). Extensive shrub and tree cover is generally restricted to coulees, snow melt areas and along waterways, also to sandy areas with an elevated water table.

2. The Parkland Ecoregion

This region is located in the Dark Brown soil zone, also transitional to the Black soil zone northward. Chernozemic soils dominate on mesic sites, Luvisolic under tree canopies, Regosols in some sandy sites, and Gleysols in subhygric areas. Annual precipitation is somewhat higher than in the prairie region (averaging about 350-400 millimetres) and temperatures are slightly lower. The parkland is a patchwork of open grasslands alternating with aspen groves, and dotted with small lakes and wetlands, these frequently surrounded by shrubby growth such as willows (*Salix* species) and gooseberry (*Ribes oxyacanthoides*). Climax grasslands are dominated by plains rough fescue (*Festuca hallii*), with minor components such as western porcupine grass (*Stipa curtiseta*), Hooker's oat grass (*Helictotrichon hookeri*) and awned wheat grass (*Agropyron trachycaulum* var. *unilaterale*). Wooded areas are a mixture of buckbrush (*Symphoricarpos occidentalis*) and aspen (*Populus tremuloides*) which, over time, develop an understory comprised of such species as bluejoint (*Calamagrostis canadensis*), awned wheat grass and Kentucky bluegrass (*Poa pratensis*). Encroachment of aspen onto the fescue grasslands is of primary concern to both ranchers and ecologists alike.

Also included as a somewhat transitional zone between the parkland and southern boreal forest is the rather unique Peace River district. It is typically warmer and drier than other regions at this latitude, being parkland-like with shrubby areas (saskatoon - *Amelanchier alnifolia* and wild cherries - *Prunus pensylvanica* and *virginiana*), aspen groves and open grasslands. Vegetation in the mesic grasslands includes needle grasses (*Stipa columbiana* and *viridula*), June grass (*Koeleria macrantha*) and wheat grasses (*Agropyron* species), while exposed and eroded slopes closely resemble drier portions of the parkland region.

Many range types occur throughout the parkland, the sandy Regosolic sites with a high sand grass (*Calamovilfa longifolia*) component, Solonetzic soils which are typically less productive, and saline depressional areas dominated by such species as Nuttall's alkali grass (*Puccinellia nuttalliana*), salt grass (*Distichlis stricta*) and alkali cord grass (*Spartina gracilis*).

3. The Foothills Ecoregion

The foothills region lies to the west of the prairies and intergrades into montane communities to the north and west. Soils are predominantly Black Chernozems in mesic grasslands, transitional into Dark Grey and Dark Grey Luvisols or Brunisols in wooded areas. Annual precipitation is relatively high, between 380 and 460 millimetres, and mean temperatures are lower than in the prairie and parkland regions. Grasslands in the foothills are characteristically our most diverse and complex, and vary significantly with microclimatic changes. As well, because moisture and soil conditions are usually favorable, rangelands are generally highly productive.

Mesic open sites are dominated by foothills rough fescue (*Festuca campestris*) with minor components such as Kentucky bluegrass (*Poa pratensis*), awned wheat grass (*Agropyron trachycaulum* var. *unilaterale*) and intermediate oat grass (*Danthonia intermedia*). On somewhat drier sites, Parry oat grass (*Danthonia parryi*) is often prominent, with Idaho fescue (*Festuca idahoensis*), June grass (*Koeleria macrantha*) and northern wheat grass (*Agropyron dasystachyum*) also increasing. On xeric, exposed sites the vegetation community will be composed of such species as bluebunch wheat grass (*Agropyron spicatum*), June grass and dryland sedges.

Shrub cover in much of the ecoregion is significant, as is the encroachment of aspen (*Populus tremuloides*) on suitable sites. Early successional woody species include green alder (*Alnus crispa*), birch (*Betula* species), lodgepole pine (*Pinus contorta*), Scouler's willow (*Salix scouleriana*), and in some locations, Douglas fir (*Pseudotsuga menziesii*). Old growth forests are dominated by white spruce (*Picea glauca*), with a rather sparse understory cover, including pine grass (*Calamagrostis rubescens*), hairy wild rye (*Elymus innovatus*), cranberry and blueberry (*Vaccinium* species), heart-leaved arnica (*Arnica cordifolia*) and bunchberry (*Cornus canadensis*).

The Cypress Hills is a disjunct fescue grassland situated in southeastern Alberta and southwestern Saskatchewan. It interrupts the prairie landscape by rising to an elevation of over 1300 metres. Soils in the region are good, and increases in precipitation (to about 400 millimetres or more annually) correlate with the higher elevation. The prairie vegetation on the lower slopes graduates into rough fescue grasslands (both *Festuca campestris* and *Festuca hallii* and also suspected hybrids between the two). Land forms are varied, consisting of rolling hills, terraces, numerous wetlands, ravines and shrubby thickets including such species as saskatoon (*Amelanchier alnifolia*), willows (*Salix* species) and hawthorn (both *Crataegus douglasii* and *rotundifolia*).

Highest elevations and north facing slopes are dominated by tree cover, the aspen and lodgepole pine forests ultimately replaced by white spruce. Productivity, species composition and diversity are comparable to that of the foothills ecoregion.

4. The Boreal Forest

The boreal forest is a vast, extensive area situated north of the parkland ecoregion. The southern portion is transitional to the parkland, dominated by Grey, Dark Grey and Dark Grey Wooded soils. Annual precipitation varies between 400 and 480 millimetres. This region characteristically has numerous wetlands where sedges (*Carex* species), cotton grasses (*Eriophorum* species), manna grasses (*Glyceria grandis* and *borealis*) and reed grasses (*Calamagrostis stricta* and *inexpansa*) are prominent.

Upland soils are predominantly Brunisols and Luvisols, and are often sandy in nature, supporting such woody species as green alder (*Alnus crispa*), aspen (*Populus tremuloides*) and jack pine (*Pinus banksiana*). Understory vegetation includes short-awn rice grass (*Oryzopsis pungens*), awned and slender wheat grass (*Agropyron trachycaulum* var. *unilaterale* and var. *trachycaulum*) and blueberry (*Vaccinium myrtilloides*).

If left undisturbed, mesic sites are dominated by forests, cover values of individual species varying in response to changes in microclimate, aspect, slope and soils. Most common are aspen, balsam poplar, with paper birch (*Betula papyrifera*) and birch hybrids in some locations, and often white spruce at late successional phases. Understory shrubs include rose (*Rosa acicularis*), low-bush cranberry (*Viburnum edule*), alder, red osier dogwood (*Cornus stolonifera*) and occasionally hazelnut (*Corylus cornuta*).

The northern boreal forest can, as a whole, be classed as less productive rangeland. Soils are predominantly Grey Wooded, often with a high organic peat content. As well, annual precipitation in some portions is slightly higher and the major factor limiting vegetation growth is the colder atmospheric temperature. Early successional upland vegetation includes woody species such as aspen and balsam poplar (*Populus tremuloides* and *balsamifera*) and birch (*Betula* species), this in time replaced by white spruce (*Picea glauca*) in climax forests. Subxeric, sandy sites occur, combining jack pine, aspen, and blueberry communities, and grass species such as short-awn rice grass, hairy wild rye (*Elymus innovatus*) and sheep fescue (*Festuca saximontana*).

Throughout the boreal forest, extensive and significant areas are covered by wetlands. At one end of the spectrum are true bogs, characterized by having little or no water movement, and acidic, nutrient-poor soils. Productivity and species richness on these sites is minimal, seen at the tree/shrub level and also with herbaceous graminoid and forb species. Typical components include Labrador tea (*Ledum groenlandicum*), peat (*Sphagnum* species), cloudberry (*Rubus chamaemorus*) and black spruce (*Picea mariana*). Also prevalent are fens and marshes which show improved soil nutrients, hence higher productivity and biodiversity. Shrub/tree cover is often increased, with the inclusion of tamarack (*Larix laricina*), and on superior sites, additions of or replacement of small bog willows (*Salix pedicellaris*) by larger species (*Salix lucida, planifolia, pyrifolia*). Prominence of sedges is frequently high, common species including (*Carex lasiocarpa, Carex aquatilis, Carex prairea, Carex diandra*, and with increased water movement, *Carex rostrata*.

5. The Montane Ecoregion

To the west of the foothills, but below subalpine elevations, lies the montane ecoregion, characterized by a pattern of forests, wetlands and grasslands. Included here are the familiar river valleys that follow the mountain passes, these more confined and narrow in the north, becoming rather extensive and significant southward. Precipitation in these regions is considerable, as is Chinook activity in southern areas that periodically allows for intermittently low snow cover. Soils are predominantly Brunisols, Grey Luvisols, Regosols, transitional to Chernozems in open grasslands and eastward into the foothills.

From a rangeland perspective, the montane region is at times underrated, lumped with the subalpine which often has lower growing, more sparse vegetation cover as a result of poorly developed, shallow soils and severe climatic limitations. By contrast, productivity and the consequent potential to support a wide diversity of life forms often equals that of the foothills region.

Driest sites occur on rocky, exposed slopes, and typical species include kinnikinnick (*Arctostaphylos uva-ursi*), hairy wild rye (*Elymus innovatus*), and tree cover is limited to a few limber pine (*Pinus flexilis*), with lodgepole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*) and Canadian buffalo-berry (*Shepherdia canadensis*) on somewhat better sites. Mesic grasslands are dominated by rough fescue (*Festuca campestris/altaica*) with Parry oat grass (*Danthonia parryi*) and bluebunch wheat grass (*Agropyron spicatum*) on drier upper slopes, and Richardson needle grass (*Stipa richardsonii*) along lower river terraces.

Forest cover on many upland sites is significant, due, at least in part, to lack of fire in recent years. Mixedwood communities are dominated by alder (*Alnus crispa*), willow (*Salix glauca, bebbiana, scouleriana*) and aspen (*Populus tremuloides*), successional to lodgepole pine and white spruce (*Picea glauca*). Understory species vary both with region and moisture regime, often including spiraea (*Spiraea betulifolia*), showy aster (*Aster conspicuus*), thimbleberry (*Rubus parviflorus*).

Wetlands are scattered throughout the region, typical species including birch (*Betula* species), willow (*Salix* species), horsetail (*Equisetum* species) and usually high cover of sedges (*Carex* species). Productivity on both the shrub and herbaceous layer is generally favorable, usually sustaining large populations of wild ungulates.

However important they may be to the well-being of the wildlife population and to the ecosystem as a whole, it is not the grasses or woody species that leave a lasting impression on the casual observer. It is, rather, the seemingly endless numbers of montane forbs, and the varied species compositions that change both with the seasons and from one ecosite to the next, and ultimately create a landscape unequalled elsewhere for its beauty.

> "The quawmash is now in blume and from the color of its bloom at a short distance it resembles lakes of fine, clear water, so complete in this deseption that on first sight I could have swoarn it was water."
>
> Meriwether Lewis, from *Original Journals of the Lewis and Clark Expedition*. June 12, 1806.

6. The Subalpine Ecoregion

Situated between the montane and true alpine regions is the subalpine ecoregion, generally defined as those areas with elevations between about 1,800 and 2,050 m. It is characterized by steep, rolling landscapes, high precipitation (usually also with good snow cover in spite of Chinook activity in some locations), and like the montane Ecoregion, contains many varied and often spectacular ecosites. The primary factor limiting vegetation growth is the severe and often harsh climate, and in some areas (as with the alpine region) poorly developed, shallow (Regosolic) soils, and often out-croppings of bedrock.

Also common in the region are subxeric sites, usually with some soil development (Brunisols) but coarse textures and steep slopes result in rapid internal and external drainage. Not unlike similar sites at lower elevations, there is usually a sparse conifer cover (lodgepole pine - *Pinus contorta*, Engelmann spruce - *Picea engelmannii*), and understory shrubs such as buffalo-berry (*Shepherdia canadensis*), kinnikinnick (*Arctostaphylos uva-ursi*) and juniper (*Juniperus* species). On the most exposed sites graminoid composition includes hairy wild rye (*Elymus innovatus*), June grass (*Koeleria macrantha*) sheep fescue (*Festuca saximontana*), bluebunch wheat grass (*Agropyron spicatum*), and in some areas a rather prominent cover of purple reed grass (*Calamagrostis purpurascens*). Increased moisture (mesic sites) correlates to higher conifer cover (alpine fir - *Abies lasiocarpa*, lodgepole pine, Engelmann spruce), and understory/early phase shrub components vary from one location to the next, including such species as alder (*Alnus crispa*) rhododendron (*Rhododendron albiflorum*), false azalea (*Menziesia ferruginea*) and tall bilberry (*Vaccinium membranaceum*). The typically sparse herbaceous understory includes, for example, hairy wild rye, pine grass (*Calamagrostis rubescens*), arnica (*Arnica cordifolia/latifolia*) wintergreens (*Pyrola/Orthilia*), small ericaceous species.

The subalpine region is not without rather extensive primary wildlife-use areas, productivity on many of these sites similar to that on equivalent montane sites. Chernozemic soils on submesic/mesic sites support rough fescue (*Festuca campestris/altaica*)-dominated grasslands, graduating to rough fescue/hairy wild rye communities and finally those with hairy wild rye as the climax species.

Subdominant graminoids vary as well, including kobresia (*Kobresia myosuroides*) big bluegrass (*Poa ampla*), Parry oat grass (*Danthonia parryi*), Richardson needle grass (*Stipa richardsonii*). Forb composition can be relatively simple on mesic grasslands, typically including such species as cinquefoils - *Potentilla* species, beard-tongues - *Penstemon confertus/procerus*, hedysarum - *Hedysarum sulphurescens*, alpine forget-me-not - *Myostis alpestris*.

As is often the case, improved soil moisture implies greater vegetation diversity, and an increase in shrubby growth. Willow (i.e. *Salix farriae/ glauca*) - birch (*Betula glandulosa/pumila*) - sedge communities are common on the most productive sites, with lower slope black spruce (*Picea mariana*) sites graduating from Gleysolic to Organic soils, and with this an often rather sparse understory comprised of such species as coltsfoot (*Petasites palmatus*), Labrador tea (*Ledum groenlandicum*) and peat (*Sphagnum* species).

Typical of any ecoregion having a naturally high diversity of ecosites, the forb as well as small (often ericaceous) shrub component is inexhaustible, and thus the temptation to include these species in this text. However, to maintain a consistency with a rangeland theme, many of these, although highly visible and photogenic, are of rather minimal importance, also have already been the subject of numerous wild flower books. The list here, then, will be limited only to those most frequently occurring on "rangelands", also species that are especially common and likely to be encountered in grazing/wildlife studies. As well, a few have been discussed in an effort to introduce common but often difficult genera (i.e. *Draba*). Admittedly, the ultimate decision as to which species to include may not always be entirely unbiased, subjectivity based at least somewhat on the author's specific field experiences.

Trees and Shrubs

Figures Showing Vegetative and Reproductive Features of Willows

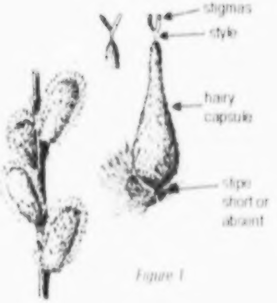

stigmas
style
hairy capsule
stipe short or absent

Figure 1

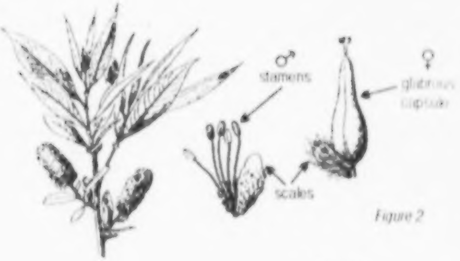

♂
stamens
♀
glabrous capsule
scales

Figure 2

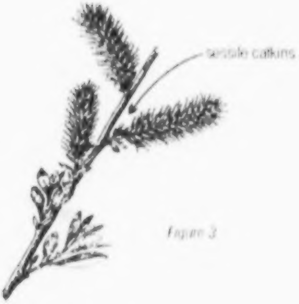

sessile catkins

Figure 3

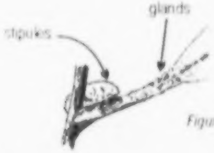
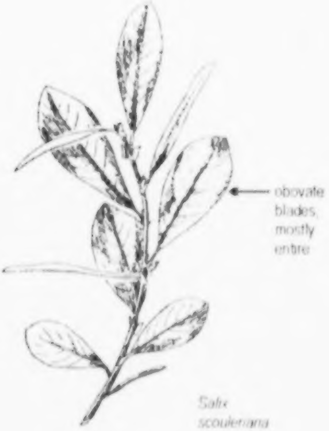
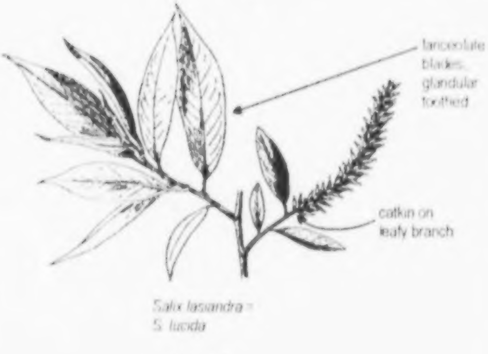

glands
stipules

Figure 4


obovate blades, mostly entire

Salix scouleriana

Figure 5


lanceolate blades, glandular toothed
catkin on leafy branch

Salix lasiandra = S. lucida

Figure 6

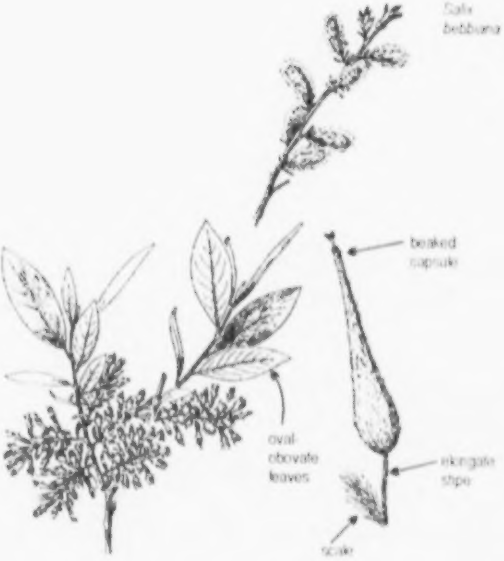

Salix
bebbiana
beaked
capsule
oval-
obovate
leaves
elongate
stipe
scale

Figure 7

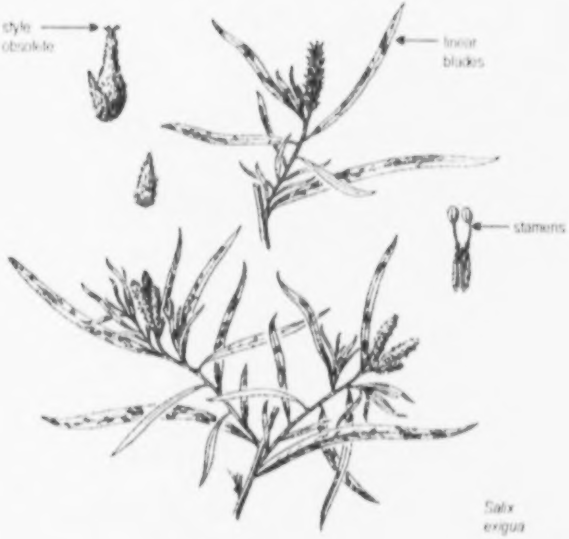

style
obsolete
linear
blades
stamens
Salix
exigua

Figure 8

Division *SPERMATOPHYTA* - Seed Plants

Key to *SPERMATOPHYTA*

1. Woody species, leaves usually evergreen, scale or needle-like; ovary not enclosing seeds, these in a dry or sometimes berry-like cone; pollen also in cones. Subdivision *Gymnospermae* Class *Coniferae*

Woody (or herbaceous) species, leaves mostly with well-developed blades, usually deciduous, ovary enclosing ovules (fruit); pollen on stamens within flowers. Subdivision *Angiospermae* Class *Dicotyledoneae*

Subdivision *Gymnospermae*

Class *CONIFERAE* - Conifers

Key to *CONIFERAE*

1. Leaves scale-like or needle-like (opposite or whorled); ovulate cones rounded, fleshy, berry-like, the scales 3-8; seeds 1-5 per berry, wingless. *Cupressaceae* p. 17

Leaves needle-like, alternate or in clusters; ovulate cones large, woody, with numerous spirally arranged scales; seeds winged. *Pinaceae* p. 20

Subdivision *Angiospermae*

Class *DICOTYLEDONEAE* - Dicotyledons

Key to *DICOTYLEDONEAE*

1. Perianth absent or of a single series of like appendages. 2

Perianth of 2 distinctly different series of appendages, the inner usually colored. 3

2. Flowers imperfect, mostly in catkins. Group I

Flowers perfect, catkins lacking. Group II

3. Corolla petals separate. 4

Corolla petals united, or flowers irregular, sometimes with some united petals. 5

4. Stamens numerous and more than twice as many as petals. Group III

Stamens up to twice as many as petals. Group IV

5. Stamens numbering more than corolla lobes. *Ericaceae* p. 146

Stamens as many as corolla lobes or less. Group V

GROUP I

1. Plants monoecious; fruit a nut or nutlet. *Betulaceae* p. 79

Plants dioecious; fruit a many-seeded capsule. *Salicaceae* p. 42

GROUP II

1. Ovary superior **2**

Ovary inferior, or nearly so **3**

2. Leaves simple, ovate-elliptic; fruit black, berry-like. *Rhamnaceae* p. 132

Leaves pinnately or palmately divided; fruit a winged samara. *Aceraceae* p. 129

3. Leaves with evident spines. *Araliaceae* p. 143

Leaves without spines (stems may be spiny) **4**

4. Leaves alternate. *Elaeagnaceae* p. 137

Leaves opposite. **5**

5. Stamens 4. *Cornaceae* p. 144

Stamens 5 or 8. .... **6**

6. Stamens 5. *Caprifoliaceae* p. 159

Stamens 8. *Elaeagnaceae* p. 137

GROUP III

1. Stems fleshy, not woody but persistent into the following season, with long spines; petals numerous; cactus. *Cactaceae* p. 134

Plants without above combination of characteristics. *Rosaceae* p. 102

GROUP IV

1. Plants with thorns, bristles or prickles **2**

Plants without the above. **5**

2. Branches and leaves spiny. *Araliaceae* p. 143

Not both leaves and branches spiny **3**

3. Leaves with spiny margins. *Berberidaceae* p.93

Leaves without spines on margins. 4

4. Branches armed with stout thorns; stamens 10. *Rosaceae* p. 102

Thorns lacking, branches with finer needle-like spines; stamens 5. *Grossulariaceae* p. 94

5. Leaves in whorls or opposite (2's). 6

Leaves alternate. 8

6. Leaves divided palmately (maple); stamens often 8 (sometimes 4-10); fruit a samara, winged. *Aceraceae* p. 129

Leaves not divided palmately; stamens 4; fruit not a samara. 7

7. Plants with reclining brownish ridged branches; leaves opposite, oval-elliptic, toothed, 1-2 cm. long; of S. Rocky Mountains. *Celestraceae* p. 131

Branches reddish; leaves opposite or in whorls at stem tips, 4-10 cm. long, entire. *Cornaceae* p. 144

8. Stamens more than 5. *Ericaceae* p. 146

Stamens 5. 9

9. Stamens positioned opposite the petals. *Rhamnaceae* p. 132

Stamens alternate with petals. 10

10. Ovary inferior; fruit several-seeded, yellow, red or black; gooseberry/currant. *Grossulariaceae* p. 94

Ovary superior; fruit 1-seeded, white to reddish. *Anacardiaceae (Rhus trilobata)* p. 98

GROUP V

1. Ovary superior. *Ericaceae* p. 146

Ovary inferior. 2

2. Flowers in heads; stamens 5, anthers coherent in a tube around style, this split at apex. *Compositae* p. 169

Flowers not in heads; stamens 4, not united. *Caprifoliaceae* p. 159

CUPRESSACEAE - Cypress Family

Common Characteristics

- Evergreen trees or shrubs.
- Leaves opposite or whorled, either needle-like or small and scale-like.
- Plants monoecious or more often dioecious.
- Staminate cones small, usually at ends of branchlets.
- Ovulate cones often terminal, small, of rather few scales (2-12), either small dry cones or blue-purple and fleshy, berry-like.
- Seeds winged or wingless, 1 or more per scale.

JUNIPERUS L. - Juniper

Common Characteristics

- Shrubs or small trees, with opposite or 3-ranked leaves.
- Plants monoecious or dioecious.
- Pollen cones catkin-like, cones rounded, 3-5 mm. long.
- Ovulate cones nearly spherical, small, with 3-8 scales in 2's or 3's, becoming fleshy, berry-like.
- Seeds 1-5 per berry, without wings.

Key to Juniperus

1. Leaves in whorls of 3, awl-shaped, spreading, mostly 5-15 mm. long *J. communis*

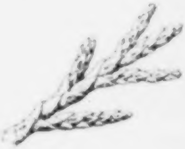
Leaves opposite, scale-like and appressed, to 1.5 mm. long **2**

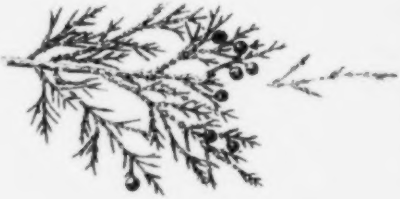
2. Plants erect or partially so, tending to be tree-like; mature leaves not sharp-pointed *J. scopulorum*

Plants mat-forming and reclining; mature leaves sharp-pointed *J. horizontalis*

Juniperus horizontalis Moench - Creeping Juniper

Growth Habit: Mostly **prostrate** trailing shrubs, the main branches red-brown, long, **horizontal and rooting**, forming mats; ascending branchlets numerous, **plants usually reaching 15-20 cm. high** but occasionally to 30 cm.; branches slender, **4-angled**; bark grey, shredding.



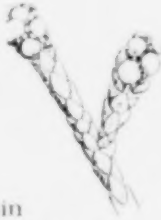


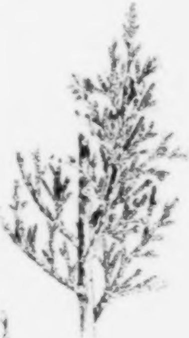
Blades: Leaves bright to deep blue-green, **opposite, scale-like** and **mostly appressed, overlapping** with the alternating pairs, **about 1.5 mm. long, abruptly short-pointed**, entire, with a gland (this sometimes depressed) on the back; young leaves tending to be more awl-shaped and longer (to 5 mm.).

Cones: Cones terminal, **on downward curved stalks, blue, with a powdery covering, 5-8 mm. across**, with 2-6 seeds, usually maturing in one year.

Similar Species:

1. ***Juniperus scopulorum*** Sarg. - Rocky Mountain Juniper
   Distributed in southern montane regions, found in open rocky places, often within river valleys. Found on dry sites.
   Differs as follows:
   - Plants taller, 2-5 (8) m. tall, the main stems several, usually erect and tree-like.
   - Bark fissured, becoming scaly-fibrous.
   - Leaves acutish, not abruptly short-pointed.
   - Berries on straight to only slightly curved stalks.



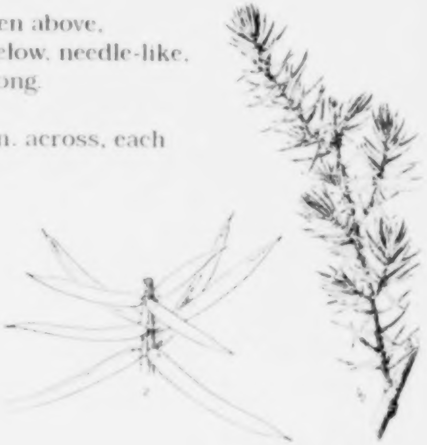


2. ***Juniperus communis*** L. - Ground Juniper

Found in much the same regions as *J. horizontalis*, less frequent in the prairies. Grows in open woods, on exposed, often rocky slopes. An indicator of subxeric ecosites in foothills and montane regions.

Differs as follows:

- Stems also reclining but often to 1 m. tall.
- Twigs 3-angled.
- Leaves dark green above, pale-glaucous below, needle-like, 5-10 (15) mm. long.
- Leaves in 3's.
- Berries 6-10 mm. across, each 1-3 seeded.
- Cones maturing the second year.



Habitat & Distribution: Common, especially in the foothills, montane and parkland regions, occasional elsewhere. Grows on dry, often rocky or sandy slopes and hillsides, in dry open woods.

Forage Value: Poor, nutritional status generally rated as lower than that of many other browse species; palatability is also poor, used by mule and white-tailed deer and elk during the winter months to some extent when food supplies become scarce; the berries are often rather extensively utilized by birds.

Grazing Response: Increasers, but none of our species particularly aggressive.

Notes: *Juniperus*, the classical Latin name for the genus, the specific name referring to the prostrate growth habit; juniper berries were used extensively by native people, collected when mature and added as a flavoring to meat; medicinal uses varied, infusions of berries effective diuretics, anticeptic barriers against infection, and known to stimulate production of hydrochloric acid in the stomach, to expel gas, and a tea thought to have contraceptive properties, also taken to treat venereal disease; teas were used for respiratory problems and as disinfectants, poplar-juniper liniments made for backaches, root infusions used as tonics; needles were burned to drive infectious diseases from homes, and juniper floors used in sweat lodges; native junipers are valued as ground cover, both for ornamental purposes and to stabilize steep slopes in native grasslands; all species are adapted to droughty, exposed sites and acidic soils and *J. horizontalis* in particular is well suited to calcareous soils; junipers establish readily from root and twig cuttings, also more slowly from seed.

PINACEAE - Pine Family

Common Characteristics

- Monoecious (ours) trees or shrubs, branches mostly whorled.
- Plants usually evergreen, the leaves linear, needle-like, either alternate or in clusters.
- Staminate cones small, solitary or in clusters, with flattened spirally arranged scales.
- Seed cones large, woody, with numerous spirally arranged scales.
- Bracts present, these subtending the scales, either free or joined to the scales.
- Seeds winged.

Key to Pinaceae

1. Leaves single on branches. **2**

Leaves in groups (2-40). **4**

2. Branches roughened from small projections; needles 4-sided. *Picea*

Branches without projections; needles not 4-sided. **3**

3. Winter buds pointed; leaf scars oval; cones drooping, with bracts 3-lobed, exceeding scales; cones remain intact. *Pseudotsuga*

Winter buds blunt; leaf scars round; cones erect, the bracts shorter than the scales; cones disintegrating at maturity. *Abies*

4. Leaves deciduous, in clusters of 10-40 on short spur-shoots, sheaths lacking. *Larix*

Leaves evergreen, in clusters of 2-5 and with papery sheaths. *Pinus*

LARIX Adans. - Larch

Common Characteristics

- Deciduous trees to 40 (50) m. tall with hard, heavy wood.
- Bark smoothish to furrowed, flaking into scales.
- Winter buds small, rounded, covered by overlapping scales.
- Branches of 2 distinct types: older branches whorled, spur-like shoots, with leaves in whorls of 10-40; new growth elongate, with leaves scattered instead of whorled;
- Leaves needle-like and narrow but rather soft, light green during the growing season, yellow in autumn, deciduous.
- Leaf clusters without subtending sheaths.
- Staminate catkins globose to short cylindric, small (7-12 mm. long), yellowish, terminal, on naked shoots.
- Ovulate cones also terminal, on leafy shoots, with thin reddish scales, becoming woody and mature at the end of the season.
- Cones subtended by thin sharp-pointed bracts.
- Seeds with a thin cuneate wing.

Key to Larix

1. Leaves 4-angled, 3-4 cm. long; seed cones 2-5 cm. long, their bracts longer than scales; mountain species. *L. lyallii*

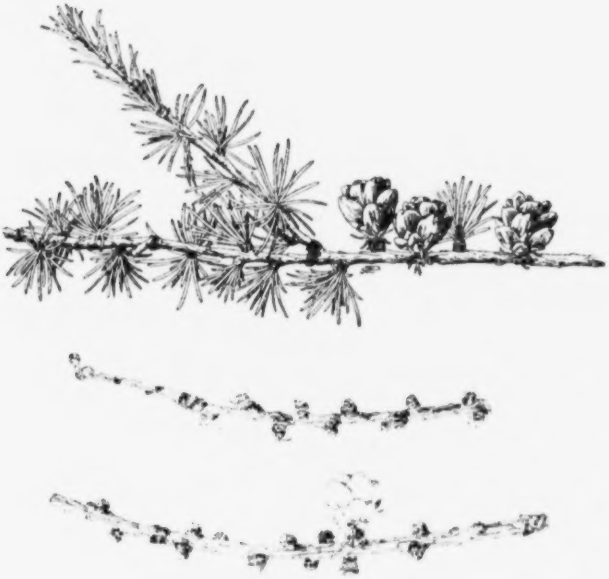
Leaves 3-angled, 1-2.5 cm. long; seed cones 1-2.5 cm. long, their bracts shorter than scales; boreal species. *L. laricina*

Larix laricina (Du Roi) K. Koch - Tamarack

Growth Habit: Medium sized **trees to about 20 m. tall**, the crown narrow, bearing horizontal branches to near the base; bark grey, thin, smooth, becoming roughened and red-brown scaly with age; twigs slender, glabrous, **having numerous short spur-like branches with crowded blackish, rough leaf scars**.

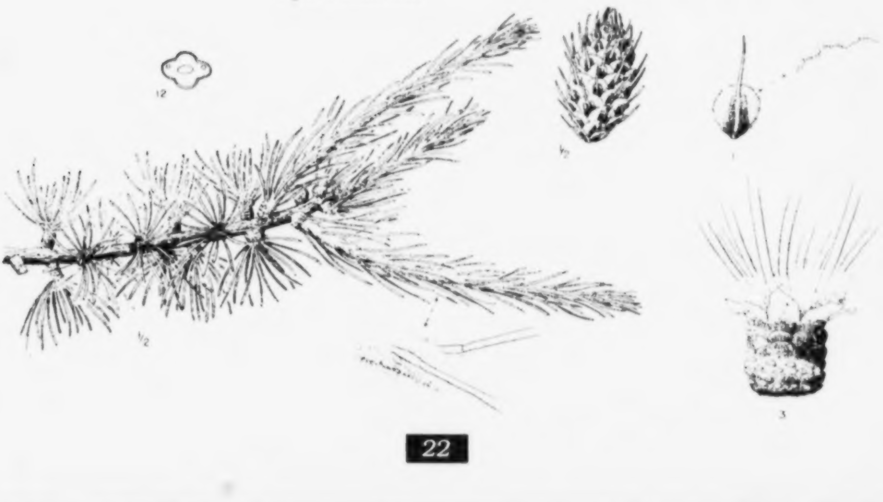
Blades: Leaves deciduous, very narrow, flexible, blue-green during summer, **12-20 per cluster or solitary on new growth, 1-2.5 cm. long, 3-angled**; resin ducts 2, on outer edges.

Cones: Staminate cones short cylindric, terminating naked shoots, the ovulate upright, short-stalked, **ovoid to globose, 1-2.5 cm. long**, scales brown at maturity, **longer than the bracts**; cones opening at the end of the season, persistent throughout winter.



Similar Species:

1. ***Larix lyallii*** Parl. - Alpine Larch
   Restricted to the Rocky Mountain region where found at high altitudes, mostly at upper timber-line.
   Differs as follows:
   - Trees smaller, to 10 m. tall.
   - Twigs finely pubescent.
   - Leaves more numerous (30-40 per cluster).
   - Leaves 4-sided, 3-4 cm. long.
   - Seed cones 2-5 cm. long.
   - Bracts of seed cones much exceeding scales, their tips reflexed.



Habitat & Distribution: Common, found primarily in the boreal forest, also in the central foothills. Grows in muskegs and fens, often associated with *Picea mariana*, *Betula papyrifera*, *Salix* species; sometimes found naturally on moist upland sites. Less frequent in nutrient-poor bogs.

Forage Value: Poor, unpalatable and seldom utilized under normal conditions; as compared to black spruce bogs, strong populations of tamarack sometimes indicate improved soil nutrients, thus increases in biomass and utilization potential of the sites.

Grazing Response: Increasers.

Notes: *Larix*, the Latin for larch, about ten species in the northern hemisphere, ranging from temperate to subarctic regions; tamarack wood is known as a superior quality fireplace fuel, also reputed to be strong, useful in making poles and fence posts; traditional medicinal uses of the genus were varied, the bark a component of poultices used to treat insect bites and a number of skin conditions, gum from the bark chewed to combat indigestion, its astringent properties useful for bleeding disorders, and bark and needles a supposed remedy for irritable bowel syndrome; larches make spectacular ornamentals, attractive year-round with their fresh spring foliage, golden colors in autumn, and naked cone-studded branches during winter.

PICEA A. Dietr. - Spruce

Common Characteristics

- Mostly large evergreen pyramidal trees with narrow crowns.
- Bark rather thin, grey-black scaly, brown beneath.
- Twigs roughened from peg-like projections of old leaf bases.
- Leaves rigid, mostly pointed, 4-sided, borne singly on all sides of the branches.
- Cones appearing on year-old branches, maturing in one season.
- Staminate cones hanging down, reddish-purple to yellow, to 2 cm. long.
- Ovulate cones egg-shaped cylindric, hanging down, deciduous as a whole, with woody, rather thin non-prickly scales.
- Small, thin narrow bracts subtending each scale.
- Seeds 2 per scale, with prominent, thin wings.

Key to Picea

1. Seed cones mostly less than 2.5 cm. long, usually persistent for several years; twigs hairy; leaves 6-14 mm. long, blunt; often in wet habitats. *P. mariana*

Seed cones longer and deciduous; twigs glabrous to finely hairy; leaves longer, more pointed; mostly upland. 2

2. Needles mostly over 1.5 cm. long, apex flat-short pointed; cones 3-8 cm. long, the scales jagged-truncate at the apex; montane to subalpine. *P. engelmannii*

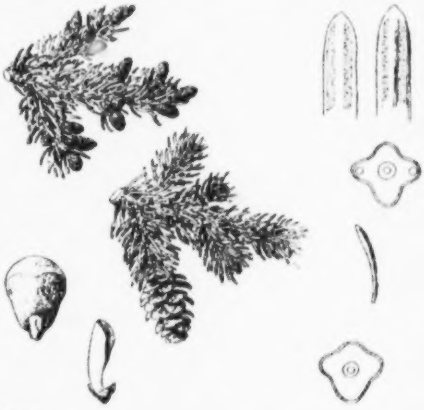
Needles to 1.5 cm. long, sharp-pointed; cones 2.5-5 cm. long, the scales entire and rounded at the apex; widespread. *P. glauca*

Key to Abies

1. Trees with thick bark, old bark fissured; lower branches with leaves pointed forward/upward, not distinctly 2-ranked; stomata evident on upper leaf surface; pollen cones purplish; seed cones with long awns on bracts, their scales to 2.5 cm. broad. *A. lasiocarpa*

Trees with thin bark, old bark scaly; lower branches with leaves spreading and definately 2-ranked; stomata absent on upper leaf surface; pollen cones yellow, often red-purple-tinged; seed cones with short awns on bracts, their scales to 1.5 cm. broad. *A. balsamea*

Picea glauca (Moench) Voss - White Spruce



Growth Habit: **Large trees, to 40 m. tall** (stunted at high elevations); usually with a narrow, spire-like crown, the branches somewhat drooping, the ends upturned; bark ashy **grey-brownish to somewhat reddish**, thin, smooth to scaly; twigs slender, **hairless, roughened from peg-like leaf bases**; winter buds hairless.

Blades: Needles **4-sided, sharp pointed, usually not more than 1.5 cm. long**, blue-green and white-lined on all 4 sides; leaves spreading on all sides of twigs but tending to be more congested near top of twigs.

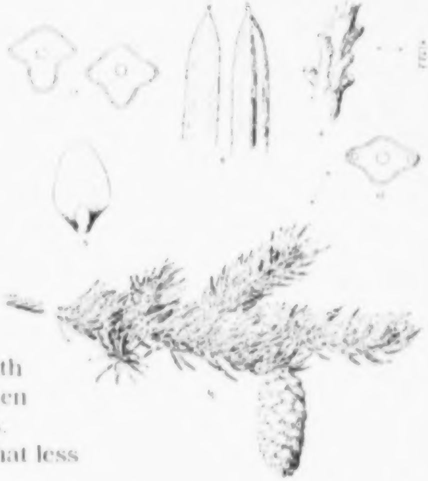
Cones: Staminate cones reddish, the ovulate **2.5-5 cm. long, cylindric**, brown, the **scales with top entire, rounded-blunt**; seeds brownish, with a broad wing.

Related Species:

1. Var. ***albertina*** (S. Brown) Sarg.
   The most widespread variety.
   - Crowns narrow.
   - Cones relatively short and broad, only about 3.5 cm. long.
2. Var. ***porsildii*** Raup
   Restricted to western montane/alpine regions from Banff National Park and northward.
   Differs as follows:
   - Crowns broader, more conical.
   - Bark light grey, smoothish, with conspicuous resin blisters.
   - Cones often longer than 3.5 cm.

Similar Species:

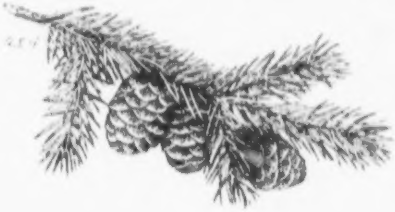
1. ***Picea engelmannii*** Parry ex Engelm. - Engelmann Spruce



Restricted to montane and subalpine (north to Jasper) areas.
Differs as follows:
- Twigs and winter buds finely hairy.
- Leaves usually over 1.5 cm. long, the tips somewhat flattened and with short points, often curved upwards.
- Needles somewhat less stiff.
- Cones larger, 3-8 cm. long.
- Seed scales with the top jagged, truncate to pointed.
- Scales more flexible.

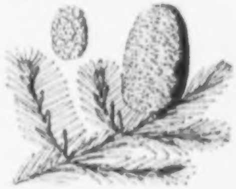
2. ***Picea mariana*** (Mill.) BSP. - Black Spruce

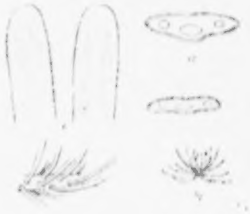
Common in the boreal forest, occasional in parkland and foothills regions. Found primarily in bogs, muskegs, and swampy woods. In the foothills and at higher elevations in the boreal forest, black spruce occurs on upland sites as an understory species in lodgepole pine forests.

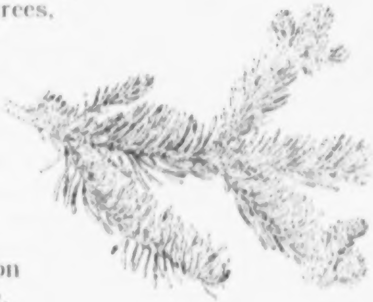


Differs as follows:
- Smaller trees to 10 (12) m. tall, crowns sometimes club-shaped.
- Bark more grey-black, scaly.
- Twigs with reddish-glandular hairs.
- Needles shorter (6-14 mm. long), blunt.
- Ovulate cones spherical/egg-shaped, less than 2.5 cm. long.
- Scales with fringed margins.

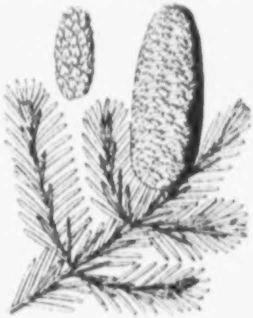
3. ***Abies lasiocarpa*** (Hook.) Nutt. - Alpine Fir
Frequent in the southern Rocky Mountain region, also present in the southern boreal forest. Grows in mesic forests, from low to subalpine elevations. Distinguished as follows:
    - Spire-like trees to 25 (30) m. tall.
    - Branches often drooping/ spray-like.
    - Winter buds blunt, resin-covered.
    - Plants with a strong balsamic odor.
    - Bark grey, smooth except fissured in older trees, with conspicuous resin blisters.
    - Leaves flat, imperfectly 2-ranked, blunt to notched; leaves pointed upward.
    - Stomata present on upper leaf surface.
    - Leaf scars circular.
    - Ovulate cones erect, near the tips of trees, cylindric-oblong, 5-10 cm. long, dark purple.
    - Scales flat, round, about 3 times as long as the bracts (these long-awned), to 2.5 cm. broad.
    - Bracts and scales falling away from the axis, this sometimes remaining intact for several years.







4. ***Abies balsamea*** (L.) Mill. - Balsam Fir
Frequent in the boreal forest, in southern boreal regions intergrading with *A. lasiocarpa*. Grows in moist, often mixedwood forests.
Differs from *A. lasiocarpa*:
    - Smaller trees, seldom reaching 20 m. tall.
    - Bark thin, the old bark scaly.
    - Leaves distinctly 2-ranked, spreading.
    - Stomata absent on upper leaf surface.



- Pollen cones yellow (purplish-tinged).
- Seed cones with short awns on bracts.
- Scales (seed cones) to 1.5 cm. broad.

Habitat & Distribution: Common in the foothills, montane and boreal forest regions, occasional in the parkland. Found mostly on upland sites with well drained soils, in subalpine forests and in mixed and coniferous woods throughout. A dominant species of upland climax forests. At moderate altitudes in the Rocky Mountains the species intergrades with *P. engelmannii*, producing hybrids, these usually having characteristics somewhat intermediate between the two parent species.

Forage Value: Poor, spruce species unpalatable to both livestock and game and only used as emergency forage in the absence of better quality species; white spruce is important in providing wildlife habitat, also browsed to some extent by small mammals (especially snowshoe hares) and the cones a choice food of red squirrels.

Grazing Response: An increaser, considered a successful competitor in all areas with moderate to high rainfall and commonly replacing birch, poplar and pine and dominating in climax forests; plants have low to moderate tolerance of browsing pressure, but low utilization usually ensures good vigor.

Notes: Derived from *pix*, pitch, the Latin name for some conifer; *glauca*, a reference to the blue-green needles; spruce gum is a well-known healing substance, at one time applied to wounds and used as a natural sun screen, also used as a plaster for setting bones; teas and vapor from young shoots were used to treat cold symptoms, and cones were chewed to relieve sore throats; white spruce has been widely planted for shelter belts and wind breaks, also is of important economic value, used extensively for lumber, logs and plywood; *P. glauca* has been used successfully in revegetating western and northern regions; it has high acid and shade tolerance, and grows best on well drained soils provided moisture requirements are met; the rather shallow, wide spreading root system is of considerable value in stabilizing soils.
Note: Abies lasiocarpa has similar value as a browse species, and is recognized as a potential species for revegetating forests throughout its range, moisture requirements somewhat higher than those of *P. glauca*; both species can be successfully established from seed and transplanting.

PINUS L. - Pine

Common Characteristics

- Evergreen trees, mostly tall and erect, sometimes spreading-shrubby, crowns narrow to broad.
- Bark thin to thick, mostly rough.
- Leaves (needles) relatively long, in clusters of 2-5, the base surrounded by a scale-like membranous sheath (these scales considered to be modified leaves), the entire cluster and its short spur-like branch ultimately deciduous as a unit.
- Staminate cones numerous, clustered at the base of new growth.
- Ovulate cones solitary-several, at tips of new growth, maturing in two years, often persistent for several years, in some species not opening for several years after maturity.
- Scales becoming woody, often thickened toward top, with a sub/terminal scar that sometimes protrudes as a sharp spine.
- Bracts small.
- Seeds usually with a large terminal wing.

Key to Pinus

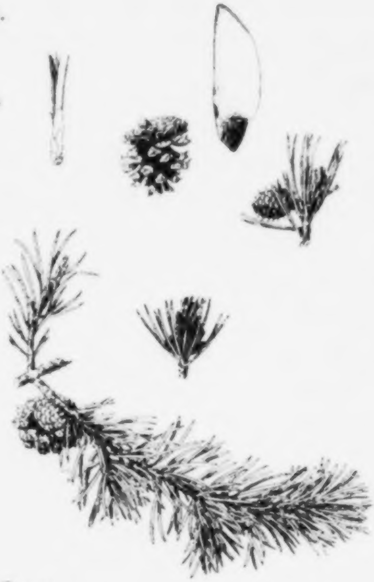
1. Needles 5 in a bundle; cones 8-20 cm. long; montane to subalpine. *P. flexilis*

Needles 2 in a bundle; cones less than 8 cm. long. **2**

2. Cones reflexed or spreading on shoots; scales each with a persistent prickle; widespread. *P. contorta*

Cones pointing toward apex of shoot, distinctly incurved or divergent; scales at maturity lacking prickles; mostly boreal. *P. banksiana*

Pinus contorta Loudon var. *latifolia* Engelm. - Lodgepole Pine



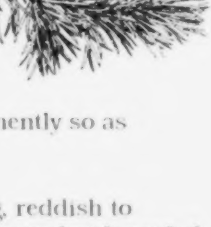
Growth Habit: Plants usually **tall, 20-30 m. high**; crowns varying from narrow in dense stands to broad and open where trees are sparse or solitary; branches upward- curved, abundant in scattered stands, often sparse or absent except toward top in dense populations; bark grey-brown, mostly rather thin, becoming scaly and furrowed; twigs orange-reddish when young, becoming grey-brown and rough; winter buds pointed, of several narrow reddish-brown scales, resinous.

Blades: Needles **in groups of 2, 2.5-6 cm. long**, somewhat twisted (but not as prominently so as *P. banksiana)*, yellowish-green.

Cones: Staminate cones **clustered**, 8-10 mm. long, reddish to greenish; ovulate cones **egg-shaped and somewhat lopsided, 3-6 cm. long, spreading or more often reflexed**; scales brownish, grey with age, **armed with small but stout, curved spines**, cones **persistent for several-many years**, some opening the second year, others remaining closed; seeds and their conspicuous wings about 15 mm. long.

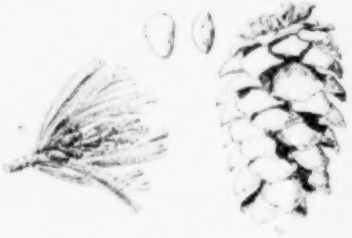
Similar Species:

1. ***Pinus banksiana*** Lamb. - Jack Pine
   Common in the boreal forest, found in light, well drained gravelly or sandy soil. Often dominating and forming extensive forests in sandy places, an indicator of subxeric sites.
   Differs as follows:
   - Branches often irregular and wide-spreading.
   - Needles 2-4 cm. long, often twisted.



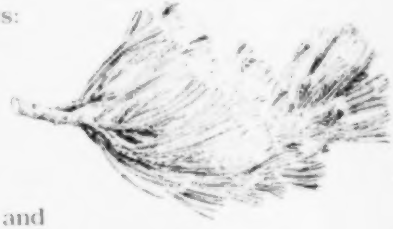
- Cones pointing up, toward apex of shoots.
- Cones usually opening at maturity.
- Scales dark purple-brown with pale tips, prickles lacking.

2. ***Pinus flexilis*** James - Limber Pine



Found on dry, exposed slopes in the foothills, also at montane and subalpine elevations. An indicator of shallow, well-drained soils, subxeric ecosites.

Distinguished as follows:



- Rather small trees 4-15 (20) m. tall; often stunted and spreading at high elevations.
- Crown broad, branches irregular and contorted.
- Needles in clusters of 5's, 3-7 cm. long.
- Cones slender-egg-shaped, 8-20 cm. long.
- Cones opening at maturity, not persisting on trees.
- Scales woody, thickened only at the tip, light brown.

Habitat & Distribution: Found in all ecoregions except the prairies and the most common tree species of the middle and lower altitudes on the eastern slopes of the Rocky Mountains. Intergrading with *P. banksiana* where their ranges meet. Forming large and sometimes nearly pure stands in foothills and montane areas, and throughout forested regions. An early successional species in white spruce forests, also a climax tree on subxeric sites.

Forage Value: Poor, rarely eaten by livestock and generally only consumed by deer and elk in the event that better quality forage is depleted; as with most evergreen species, utilization to any extent indicates an over-population of game; lodgepole pine does provide significant amounts of food to small mammals, also to grosbeaks and nutcrackers; ingestion of needles has been linked to abortions in livestock.

Grazing Response: An increaser, often a pioneer after fire, also invading woodlands after deciduous tree establishment; tolerance of heavy browsing is low in comparison to most deciduous species, but under normal conditions utilization is light.

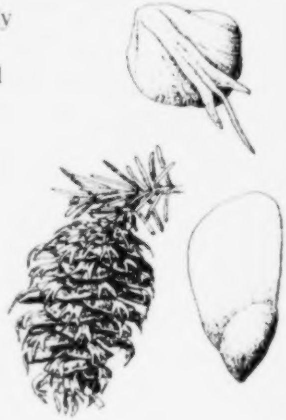
Notes:

Pinus, the old Latin name for pine, *contorta*, twisted, alluding to the contorted shoots of some varieties; the common name appropriately given, as the trees were cut and peeled by native people and used for "lodge poles" or tipi framework; pine needles were sometimes used in tea or eaten by Indians, apparently most palatable in the spring, and high in vitamins C and A; inner bark was used as a spring tonic, and the pulp and gum applied as a poultice on infections; buds were chewed for sore throats, and decoctions used for T.B. and stomach problems; strong infusions of needles were apparently used as a birth control method; both pitch "steam" and twig smoke were considered effective treatments for a variety of respiratory problems; commercially, lodgepole pine is an important source of wood for pulp, also valued as a reclamation species, showing relatively fast growth in comparison to other conifers; plants establish readily from both seed and transplanting.

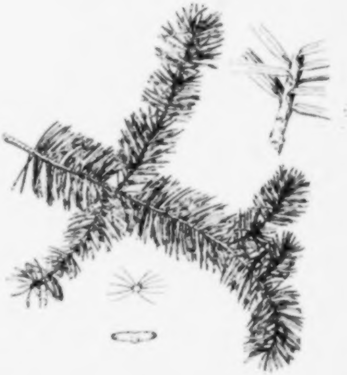
Note: Jack pine (*P. banksiana*) has similar forage value, and is also an aggressive competitor in its natural range, especially useful in revegetating sandy soils in central and northern regions; both *P. banksiana* and *P. contorta* are less shade tolerant than white spruce and alpine fir, but perform better in drier sites.

PSEUDOTSUGA Carr. - Douglas Fir

Pseudotsuga menziesii (Mirb.) Franco - Douglas Fir



Growth Habit: **Very large trees to 80 m. tall**, usually considerably smaller (to 50 m.) in Alberta; **young trees with pyramidal crowns** and rather **thin, smooth bark**; older trees with **massive trunks, the bark very thick, dark brown, rough and furrowed, the crowns broad and flat**; branches spreading-drooping, often irregular; branchlets drooping, hairy, becoming roughened from stubs of old leaf bases; winter buds **sharp-pointed**, reddish-brown, **not resinous**.



Blades: Needles **single**, spirally arranged, spreading or upward turned but not uniform in a single plane; needles **2-3 cm. long, flat, blunt to acutish**, dark yellow-green to bluish-green, **narrowed to short stalk-like bases**, slightly grooved above, 2-grooved beneath (stomatic bands in grooves) and with a prominent midvein between; leaf scars **oval**.

Cones: Staminate cones reddish to yellowish, 6-10 mm. long; ovulate cones **drooping, 5-10 cm. long**, maturing and opening the first season, not persistent, **deciduous as an entire unit**; scales purple-green when immature, turning **reddish-brown, hairy, stiff; bracts prominently exserted**, broad at the top and **3-lobed**, the **middle lobe longest**, narrow; seeds 5-6 mm. long, the wing about twice this length.

Habitat & Distribution: Grows in southern B.C. and in the southern Rocky Mountains. Found on slopes and in open woods, usually not a component of dense, extensive forests. Often found on rocky, calcareous sites, and typically prefers subxeric-mesic, well-drained habitats.

Forage Value:	Poor, browsed to some extent by game, but utilization usually restricted to winter months and in the absence of better quality species.
Grazing Response:	An increaser and successful competitor on rangelands but, in Alberta, restricted to choice localities in montane regions; as with most evergreen trees, tolerance of browsing pressure is relatively low.
Notes:	From the Greek *pseudo*, false, and *Tsuga*, the Japanese name for hemlock; Douglas-fir was known to have some value to native people, the leaves used in a sweat bath as a cure for rheumatism, and spring buds were boiled and the solutions used in treating venereal disease; *P. menziesii* is widely distributed in N. America, and is considered one of the world's most important timber trees; as well, it is sometimes grown as an ornamental, and is recommended for re-forestation in montane areas in the southern cordillera; acid tolerance is good, the species best adapted to deep sandy loams where soil moisture is plentiful; methods of establishment can include both development from seed and transplanting.

SALICACEAE - Willow Family

Common Characteristics

- Deciduous trees or shrubs, plants dioecious.
- Bark bitter.
- Leaves alternate, stipulate (stipules sometimes early deciduous), simple.
- Flowers arranged in catkins, perianth absent, each flower subtended by a bract (scale), and either subtended by a cuplike disc *(Populus)* or by two enlarged basal glands *(Salix)*.
- Staminate flowers with 1-many stamens.
- Seeds numerous, small, covered by long hairs, contained in capsules.

Key to Salicaceae

1. Winter buds covered by several scales; catkins drooping at maturity; catkin bracts mostly deeply slashed; flowers on a disc; stamens mostly more than 10; trees. *Populus*

   Winter buds covered by a single scale; catkins sometimes spreading but not drooping; bracts not toothed to shallowly so; flower disc absent; stamens few, mostly 2; shrubs, rarely tree-like. *Salix*

POPULUS L. - Poplar; Cottonwood

Common Characteristics

- Mostly trees over 5 m. tall, occasionally shorter and shrubby.
- Bark furrowed to smooth.
- Buds covered by several scales, often resinous.
- Stipules small and early deciduous.
- Catkins drooping, appearing before leaves, their bracts slashed to lobed.
- Flowers borne on discs, the staminate on a broad disc, the pistillate on a cup-shaped disc.
- Stamens mostly 10 or more per flower, stigmas and capsule valves 2-4.

Key to Populus

1. Petioles distinctly flattened. **2**

   Petioles not flattened. **3**

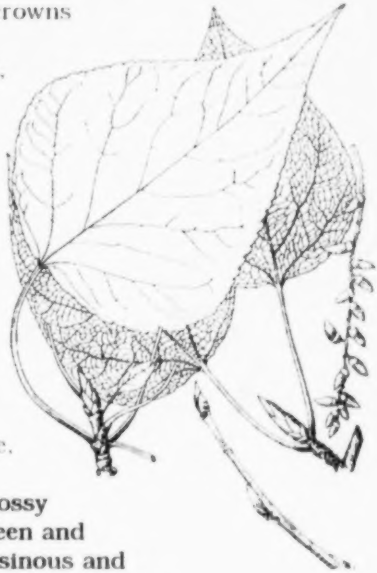
2. Blades circular, entire to crenate, 2-6 cm. long; bark smooth and greenish-white. *P. tremuloides*

   Blades cordate-deltoid, distinctly crenate, 5-10 cm. long; bark grey and furrowed. *P. deltoides*

3. Blades narrow, 3-7 times as long as broad; petioles 1/3 the blade length; prairie species. *P. angustifolia*

   Blades ovate-lanceolate, petioles longer than 1/3 blade length; widespread species. *P. balsamifera*

Populus balsamifera L. ssp. ***balsamifera*** - Balsam Poplar



Growth Habit: Trees **up to 25 m. tall**, the crowns broad; trunks sometimes massive; bark greyish-white, **becoming dark grey and furrowed**; branches grey-brown, the twigs pale grey-brown and **often orange mottled**; buds **large, conspicuously resinous-gummy**.

Blades: Leaves **5-15 cm. long, pointed to long-pointed, ovate-lanceolate**, the bases rounded-broadly wedge-shaped to subcordate, on long **rounded stalks** 2-6 cm. long; leaves **deep glossy green above, pale yellow-green and often rusty-tinged below, resinous and fragrant**, shallowly toothed; blades hairless except for fine hairs on veins below and on margins.

Inflorescence: Catkin scales lacerate-fringed; staminate catkins 2-3 (4) cm. long, the stamens 12-20 per flower; pistillate catkins appearing before leaves, 8-20 cm. long, the capsules lanceolate, 6-10 mm. long, usually hairless, 2-valved, nearly stalkless.

Related Species:

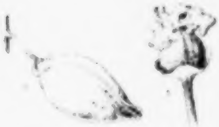
1. Ssp. ***trichocarpa*** (T. & G. *ex* Hook.) Brayshaw - Black Cottonwood
   More restricted in its range, generally in southern regions.
   Differs as follows:
   - Larger trees, the twigs often angled in cross-section.
   - Stamens 40-60 per flower.
   - Capsules hairy, 3-valved, nearly spherical.

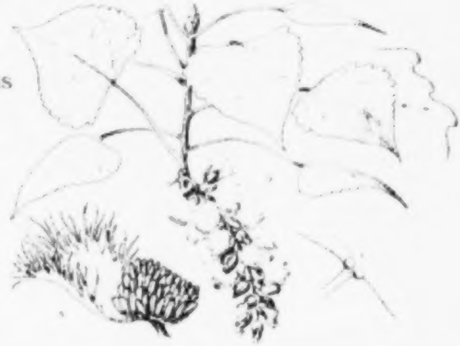
Similar Species:

1. ***Populus deltoides*** Marsh. var. ***occidentalis*** Rydb. - Western Cottonwood
   Found primarily in the prairies, occasional in the parkland region. Grows on shores, on river flats, also in sandy grassland where the water table is high.

Distinguished as follows:

- Large trees (to 25 m. tall), trunks sometimes to 1 m. thick.
- Bark rough-furrowed.
- Twigs stout, grey-brown.
- Bud scales somewhat resinous, hairy, margins fringed.
- Leaf stalks flattened.
- Leaves large (5-10 cm. long), broadly triangular, sometimes heart-shaped at the base.
- Leaf margins with blunt, thick teeth.





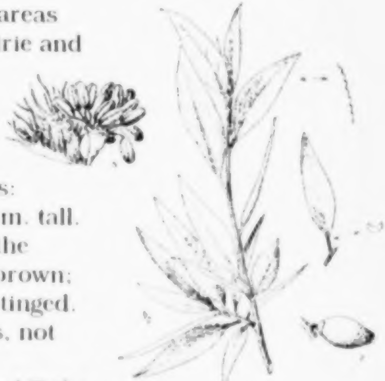
2. ***Populus angustifolia*** James - Narrow-leaf Cottonwood

Restricted to southern areas where found in the prairie and foothills regions.

Locally abundant in river valleys, along streams.

Distinguished as follows:

- Slender trees to 15 m. tall.
- Bark rough, it and the branches greenish-brown; young twigs orange-tinged.
- Bud scales resinous, not hairy on margins.
- Leaf stalks short (to 1/3 the length of blades).
- Blades elongate (narrowly lanceolate), 5-10 cm long, wedge-shaped at the base, finely toothed.



Habitat & Distribution: Common throughout most areas. Grows in the boreal forest and on upland sites on well drained soils in areas with high moisture. Restricted to shores, river flats, coulee slopes in drier regions. In many situations balsam poplar will replace aspen as moisture conditions improve, and its occurrence is an indicator of a change in ecosite type.

Forage Value: Poor; although actual nutrient levels are probably acceptable, the gummy-resinous foliage and twigs are less palatable than other *Populus* species, and heavy utilization usually indicates an over-population of game or livestock; as with all poplar species, *P. balsamifera* is important in providing habitat and shelter for wildlife, also a valuable source of food for beaver; both *P. angustifolia* and *P. deltoides* are palatable as well, but are less abundant, thus supplying considerably less forage, and as non-suckering species, few new shoots are produced that are within browsing reach.

Grazing Response: Increasers, most native poplars aggressive competitors in their adapted ranges, and show good resistance to heavy browsing and clipping as they readily regenerate vegetatively.

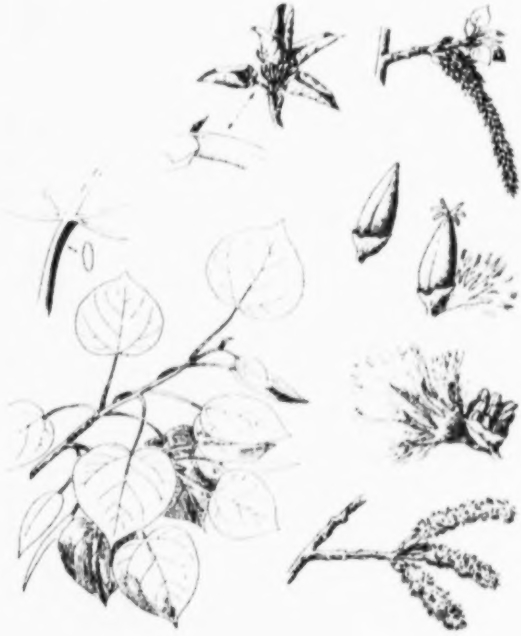
Notes: *Populus*, the classical Latin name for the plants, the specific and common name allude to the balsam-like, fragrant resin; also called balm-of-Gilead; Cree Indians used liquids extracted from bark to cure coughs, the bark also listed as tonic, stimulant and diuretic; inner bark was a source of human food, also fed to horses along with twigs if other feed was in short supply; the wood was a highly valued source of firewood, and warriors used the sap to rub on their bodies to mask human scent when stealing horses; although soft, the wood has considerable commercial value, used for boxes and crates, especially for plywood and pulpwood; balsam poplar has been planted with some success in wind breaks and shelter belts, although, as with other members of the genus, its life span is short; it also has potential as an early successional reclamation species in areas where moisture conditions are favorable.

Populus tremuloides Michx. - Aspen; Aspen Poplar

Growth Habit: Slender trees, **colonial from suckers arising from an extensive root system**, usually to 15 (20) m., occasionally taller; bark **greenish-white, mostly smooth, dark and roughened only on old trees**; twigs yellowish-green, turning reddish-brown; winter buds short, pointed, bud **scales glossy but not resinous**, reddish-brown, the margins pale.

Blades: Stalks **flattened, often as long as blades**; leaves **circular to broadly ovate**, the bases rounded to subcordate, the top pointed, **2-7 cm. long**; leaves mostly hairless, the margins nearly entire to finely toothed, paler beneath.

Inflorescence: Scales deeply cleft into several hair-fringed lobes, often persistent until fruit matures; stamminate catkins 2-3 cm. long, early deciduous, the stamens 6-14 per flower; pistillate catkins 4-10 cm. long, the capsules lanceolate-ovate, 4-6 mm. long, hairless, roughened; carpels 2, stigmas 2, each deeply 2-3 cleft.



Populus Hybrids:

Poplars are known to hybridize rather readily, the resulting trees showing characteristics intermediate between the two parental species. Several such hybrids have been recognized:

1. *P. x andrewsii* Sarg. *(P. deltoides x P. tremuloides).*
2. *P. x brayshawii* Boivin *(P. angustifolia x P. balsamifera).*
3. *P. x dutillyi* Lepage *(P. balsamifera x P. tremuloides).*
4. *P. x jackii* Sarg. *(P. balsamifera x P. deltoides).*
5. *P. x sennii* Boivin *(P. angustifolia x P. tremuloides).*
6. *P. x acuminiata* Rydb. *(P. angustifolia x P. deltoides).*

Habitat & Distribution:

Common and widely distributed. Grows in most regions, often forming large groves. Restricted to depressional and moist areas in driest regions. In the west, high cover at both early and late successional phases indicates mixedwood ecosites, often implying improved ungulate forage production potential as compared to conifer dominated sites.

Forage Value:

Fair, protein and phosphorus levels high and crude fiber low, and both leaves and twigs highly palatable throughout the season to game and livestock (utilized to a greater extent by sheep provided branches are within reach); aspen is also an important browse plant during fall and winter; utilization varies, depending on associated species; sparse or unpalatable undergrowth and also an abundance of good forage in open areas will result in a reduction in browsing; it can be noted that, in foothills/montane Ecoregions, high prominence of aspen (as compared to conifers) can be correlated to increased biomass of both palatable shrubs and herbaceous species in earlier phase communities.

Grazing Response:

An increaser and invader on native rangeland; aspen is a forest forming tree and by far our most aggressive poplar, very tolerant of heavy browsing, the clipping stimulating new sucker growth as well as regrowth on older wood; only in cases of severe overgrazing or when growing in marginal habitats will expansion of clones be kept in check; its success as a competitor can also be attributed to adaptation to a wide range of moisture regimes and soil textures, performing best on moist sandy or gravelly loams, also grows well on rather poor, infertile soils, although tolerance of saline, alkaline and acidic conditions is low; aspen is intolerant of shade and will ultimately be replaced by conifers in cases where canopy cover is dense; changes in the understory vegetation in aspen forests occur over time, due to both increased competition, shade and higher levels of soil acidity caused by leaf fall.

Notes: The specific name as well as various common names (trembling or quaking aspen) all refer to the characteristic motion of the leaves in the wind; medicinal uses of the species were rather numerous, the inner bark taken by native people as a tonic for stomach and liver problems, to treat headaches and weakness of the female reproductive organs; the bark contains aspirin-like salicin, and was used for fevers, rheumatism, colds, worms, urinary infections and diarrhea; the young bark was valued as winter food for horses; commercially, *P. tremuloides* is used primarily for pulpwood, plywood, in making crates and boxes; the shallow spreading root system and suckering capacity makes aspen useful in stabilizing disturbed soils, the species propagated successfully from both seed and stem cuttings; in areas where it is best adapted and in native fescue grasslands, however, less invasive alternatives should be considered.

SALIX L. - Willow

Common Characteristics

- Mostly shrubs to 5 m. tall, stems usually several, occasionally taller and tree-like, or, in some species, plants depressed, dwarf, mat-forming.
- Plants deciduous, unisexual.
- Buds non-resinous, covered by a single scale.
- Leaves alternate, simple, mostly stipulate.
- Catkin scales mostly entire.
- Discs subtending flowers absent.
- Catkins erect-spreading, not drooping.
- Staminate flowers with 1-7 (usually 2) stamens each.
- Capsules 2-valved, with 2 stigmas, these often cleft.

Key to Salix

1. Leaves not glaucous beneath (although sometimes somewhat paler). 2

Leaves definitely pale-glaucous beneath. 6

2. Leaves linear, margins remotely toothed to entire; bracts pale, early deciduous; colonial species. 3

Leaves broader, narrowly elliptic to ovate; plants not colonial. 4

3 Leaves linear; lower surface not pale; styles lacking; branches pale. *S. exigua*

Leaves very narrowly elliptic, their sides not parallel; lower surface somewhat paler; styles short but evident; branches grey-red brown. *S. melanopsis*

4. Leaves firm; capsules densely hairy. *S. maccalliana*

Leaves thin; capsules glabrous. 5

5. Leaves long-pointed at the apex; blades narrowly elliptic; glands present on petioles at base of blades. *S. lucida*

Leaves not long-pointed, broader; glands on petioles at base of leaves absent. *S. myrtillifolia*

6. Dwarf shrubs, from creeping stems; bracts dark-tipped, with straight hairs; styles red in life; branches mostly glabrous; Rocky Mountain species. *S. arctica*

Plants mostly taller, usually at least 1.5 m. tall. 7

7. Leaves glabrous below at maturity. 8

Leaves hairy below. 20

8. Capsules glabrous. 9

Capsules hairy. 17

9. Glands present on petioles at base of blades. 10

Glands on petioles at base of blades absent. 11

10. Capsules 5-7 mm. long, maturing in early summer; stipules leaf-like, conspicuous. *S. lucida*

Capsules 7-9 mm. long, maturing in late summer; stipules small. *S. serissima*

11. Stipules leaf-like on older growth, conspicuous. 12

Stipules on older growth very small, reduced to minute glandular lobes. 14

12. Young leaves not red-tinged, sometimes with white/rusty hairs on the midribs; catkins stalked on short leafy branches. *S. farriae*

Young leaves red-tinged; catkins essentially sessile. 13

13. Branches pale grey-yellow; leaves not toothed or only obscurely so; catkin axis very hairy. *S. lutea*

Branches red-brown; leaves distinctly toothed. *S. pseudomonticola*

14. Trees; leaves with apex long-pointed; prairie species. *S. amygdaloides*

Shrubs; leaves not long-pointed; widespread. 15

15. Leaves with bases cordate and usually asymmetrical; young leaves thin and reddish; mature leaves firm, rugose below. *S. pyrifolia*

Leaves with bases more or less symmetrical and rounded. 16

16. Leaves often with some rusty hairs on midrib, not glaucous above, the apex pointed. *S. farriae*

Leaves glabrous, often glaucous above and below, the apex rounded. *S. pedicellaris*

17. Catkins sessile; stipes on capsules to 2.5 mm. long. 18

Catkins stalked on leafy branches; stipes on capsules to 5 mm. long. 19

18. Leaves with veins parallel and close together, dark green/glossy above at maturity; stipes on capsules to 0.9 mm. long. *S. planifolia*

Leaves with veins not distinctly parallel, more widely spaced, not highly glossy; stipes on capsules 2-2.5 mm. long. *S. discolor*

19. Leaves rugose-wrinkled, elliptic-obovate, entire or toothed; bracts pale-tawny. *S. bebbiana*

Leaves narrow, usually at least somewhat toothed; bracts dark brown. *S. petiolaris*

20. Catkins sessile 21

Catkins on leafy branches. 26

21. Leaves densely woolly-white hairy below. 22

Leaves nearly glabrous or somewhat hairy below. 23

22. Branches dark and often glaucous, finely hairy to glabrous; slender-stemmed shrubs to 3 m. tall. *S. drummondiana*

Branches velvety-woolly, not glaucous; stems often thick; plants 3-12 m. tall, often tree-like. *S. scouleriana*

23. Branches velvety; leaves obovate, broadly rounded at apex, with some rusty hairs below; tall, often tree-like species. *S. scouleriana*

Leaves narrower, without rusty hairs when mature. 24

24. Buds, stipules oily; stipules ovate and glandular; mountain species. *S. barrattiana*

Buds and stipules not oily; stipules narrower; distribution variable. 25

25. Leaves glabrous to sparsely hairy below; leaf margins not rolled. *S. planifolia*

Leaves silky-woolly below, the margins rolled. *S. drummondiana*

26. Capsules with stipes 2-5 mm. long. 27

Capsules with stipes only to 1.6 mm. long. 28

27. Leaves rugose-wrinkled, elliptic-obovate, entire to toothed; bracts pale-tawny; leaf veins raised on underside. *S. bebbiana*

Leaves narrower, usually at least somewhat toothed; bracts dark brown. *S. petiolaris*

28. Leaves narrowly ovate, distinctly toothed, with silky hairs below, some of these rusty. *S. arbusculoides*

Leaves either woolly-hairy or glabrous below. 29

29. Leaves densely tangled-hairy and white-woolly below, the margins rolled; styles red in life; bog/fen species. *S. candida*

Leaves without above combination of characteristics; styles yellow-green in life. **30**

30. Catkins on 3-leaved branches; capsules ovate; petioles with dark glands; leaves wrinkled-reticulate above; mountain species. *S. vestita*

Catkins on short leafy branches; petioles without glands; leaves not wrinkled above. **31**

31. Leaf petioles elongate, more than 3 times the bud length; capsules on distinct stipes (to 1.6 mm. long); pistillate catkins cylindrical. *S. glauca*

Leaf petioles short, up to 3 times the bud length, red-tinged; capsules nearly sessile; pistillate catkins short-cylindric to globose. *S. brachycarpa*

Vegetative and Habitat Key to Salix

1. Leaves green beneath, not glaucous (but sometimes paler). **2**

Leaves distinctly pale-glaucous below. **7**

2. Leaves linear, margins remotely toothed to entire; bracts pale, early deciduous; colonial species, found on wet shores. **3**

Leaves broader, narrowly elliptic to ovate; plants not colonial; habitat variable. **4**

3. Leaves linear, their sides mostly parallel; lower surface not pale; styles lacking; branches pale; widespread. *S. exigua*

Leaves very narrowly elliptic, their sides not parallel; lower surface somewhat paler; styles short but evident; branches grey-red brown; restricted to western regions. *S. melanopsis*

4. Mature leaves firm and thick, elliptic-oblong, margins glandular-toothed; pubescence of reddish and white hairs, leaves glabrous at maturity; twigs dark red-brown, glabrous, glossy. *S. maccalliana*

Mature leaves not firm and thick; branches usually paler. **5**

5. Plants sometimes tree-like, to 9 m. tall; leaves large, 6-15 cm. long, ovate and distinctly long-pointed; petioles glandular at base. *S. lucida*

Plants smaller, to 4-5 m. tall; leaves smaller and not long-pointed; petioles not glandular at base. **6**

6.	Low, matted bog shrubs less than 1 m. tall; stipules mostly minute, to 2 mm. long; leaves glabrous even when young.	*S. myrtillifolia* var. *myrtillifolia*
	Plants mostly over 1 m. tall (to 6 m.); stipules larger than 2 mm. (to 5 mm.); young leaves with at least some hairs, at least on midrib above; habitat more variable.	*S. myrtillifolia* var. *cordata*
7.	Stems creeping; bracts dark-tipped, with straight hairs; styles red in life; branches mostly glabrous; dwarf shrubs restricted to montane to alpine elevations.	*S. arctica*
	Plants not stoloniferous.	8
8.	Leaves glabrous, or nearly so, at maturity.	9
	Leaves with some evident pubescence below at maturity.	21
9.	Petioles glandular at the base of blade; *S. pyrifolia* may fit here but glands not always evident.	10
	Petioles not glandular at base of blade.	11
10.	Branches reddish and glossy; older twigs exfoliating outer layers; mature leaves firm and thick, dark green above, elliptic-oblong, 5-7 cm. long, without elongated pointed tips; stipules commonly very small; shrubs to 4 m. tall.	*S. serissima*
	Branches reddish to yellowish, not highly glossy; leaves not firm and thick, not dark green, 6-15 cm. long, ovate and usually long-pointed; stipules mostly conspicuous; sometimes tree-like, to 9 m. tall.	*S. lucida*
11.	Stipules usually conspicuous, at least 1 mm. long.	12
	Stipules absent or very small on older growth.	14
12.	Young leaves greenish, glabrous or with a few white and rusty hairs on midrib; margins mostly entire; species mostly of western regions.	*S. farriae*
	Young leaves with at least some reddish-tinge; distribution generally more widespread.	13
13.	Branches grey-yellow; leaves nearly entire to shallowly toothed; blades narrowly elliptic and abruptly long-pointed or acute; occasionally tree-like and to 9 m. tall.	*S. lutea*
	Branches reddish to pale brown; leaves glandular-toothed, broader, elliptic-obovate, the bases subcordate to rounded; not tree-like.	*S. pseudomonticola*

14. Leaves ovate/narrowly ovate, the tips long-pointed; blades 5-12 cm. long; tree-like prairie species. *S. amygdaloides*

Leaves not long-pointed; smaller shrubs, not tree-like. **15**

15. Young leaves translucent, thin; older leaves firm, with bases asymmetrical, often cordate, rugose below; glands sometimes present at base of blades; boreal species. *S. pyrifolia*

Young leaves thicker, the bases rounded and not asymmetrical; leaves not conspicuously rugose below. **16**

16. Small plants, mostly not more than 2 m. tall. **17**

Larger plants, over 2 m. tall. **18**

17. Leaves glabrous, often glaucous on both sides, the apex round; small plants to 1.5 m. tall, mostly of poor (acid/calcareous) bogs. *S. pedicellaris*

Leaves with at least some hairs on midrib, not glaucous above; some hairs rusty; leaf apex pointed; plants taller, to 2 m., of more varied hygric-subhydric habitats. *S. farriae*

18. Leaves highly glossy and dark green above, the veins numerous and parallel; species of subhygric-hygric sites. *S. planifolia*

Leaves dull above, the veins fewer, more widely spaced, not parallel. **19**

19. Blades elliptic-obovate, entire to toothed, veins depressed above, protruding below, giving leaves a rugose-rough-veiny appearance; species of rich upland sites; rusty hairs absent. *S. bebbiana*

Blades not rugose-rough-veiny from protruding veins; at least young leaves with some rusty hairs. **20**

20. Blades broad (elliptic-obovate), margins somewhat toothed or wavy. *S. discolor*

Blades narrow (narrowly oval), narrowed at both ends, the margins with distant glandular teeth. *S. petiolaris*

21. Low growing shrubs to 1.5 m. tall; of mountains, bogs, fens or shores. **22**

Taller plants; habitat and distribution variable. **25**

22. Stipules and buds oily/leaves silvery, or petioles with dark glands and leaves dark green above; Rocky Mountain species. **23**

Plants without above combinations of characteristics; not restricted to Rocky Mountains. **24**

23. Buds and stipules oily; stipules broad-ovate with conspicuous glands; leaves grey-hairy; branches woolly. *S. barrattiana*

Oil lacking but petioles with dark glands; leaves dark green and rough-rugulose above; branches mostly glabrous. *S. vestita*

24. Leaves narrow (narrowly elliptic-ovate) margins revolute and often crenate; upper leaf surface roughened, sometimes greenish, the lower white-woolly; bog/fen species. *S. candida*

Leaves broader (elliptic-obovate), entire and not revolute; upper surface not rough (lower woolly); leaf veins depressed above; internodes short; leaf petioles short, reddish. *S. brachycarpa*

25. Leaves narrow (narrowly ovate), tapered at both ends; rusty hairs present; leaf hairs smooth-sericeous. **26**

Leaves broader (ovate, elliptic, obovate). **27**

26. Leaf veins parallel and close together, margins closely glandular-serrate; stipules large, glandular. *S. arbusculoides*

Leaf veins not as above, margins rather remotely toothed; stipules small, not conspicuous. *S. petiolaris*

27. Leaves only sparsely pubescent at maturity. **28**

Leaves densely woolly at maturity, at least below. **31**

28. Plants often tree-like, 3-12 m. tall; branches velvety-hairy; often on mesic upland sites; leaves broad-obovate, with velvety hairs, some of these rusty. *S. scouleriana*

Plants not thick-stemmed, tree-like; to 4 m. tall; branches with longer tomentose hairs or glabrous; leaves narrower. **29**

29. Plants to 4 m. tall, branches mostly glabrous and dark reddish-black; lower leaf surface with shiny sericeous-lanate hairs; leaf margins revolute. *S. drummondiana*

Leaf margins not revolute. **30**

30. Leaf veins close together and parallel, upper surface dark glossy green, the lower with some white and rusty hairs; plants to 4 m. tall. *S. planifolia*

Leaf veins more irregular and widely spaced; leaves often hairy above, rusty hairs on lower surface lacking; plants mostly smaller, to 2 m. tall. *S. glauca*

31. Tree-like, thick-stemmed plants 3-12 m. tall, often upland; pubescence short-velvety; leaves broad-obovate, lower surface pale-velvety, some hairs rusty. *S. scouleriana*

Shrubs to 5 m. tall; pubescence of longer hairs, these rarely rusty on mature leaves. **32**

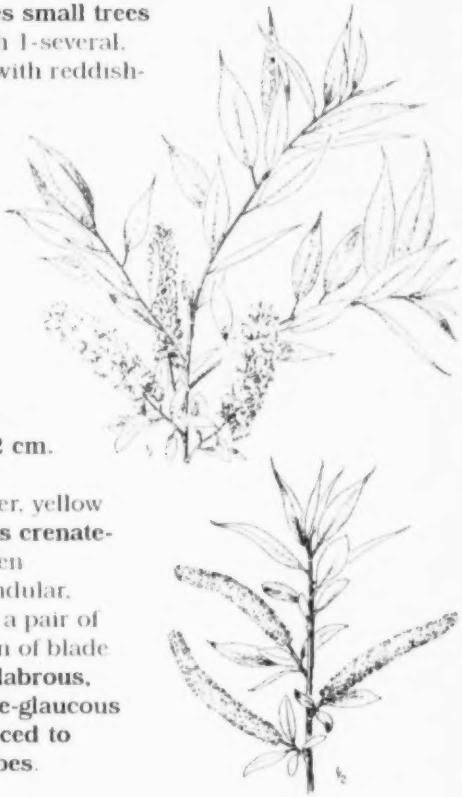
32. Branches often glabrous, dark red-black, often glaucous; leaf margins revolute, with shiny hairs below. *S. drummondiana*

Branches paler, grey, pubescent at least when young; leaf margins not revolute; hairs not shiny. **33**

33. Leaves with veins on upper surface depressed, the surface rugose-wrinkled; leaf margins entire to wavy/blunt-toothed; widespread, often on rich upland sites. *S. bebbiana*

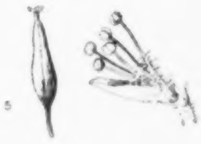
Leaves without rough-rugose upper surface from depressed veins; leaf margins entire or with remote glandular teeth; of western and northern regions. *S. glauca*

Salix amygdaloides Anderss. - Peach-leaved Willow



Growth Habit: Shrubs or **sometimes small trees up to 10 m. tall**, with 1-several, often leaning stems with reddish-brown rough bark; **branches slender**, often drooping, yellow/yellow-grey to reddish-yellow, **becoming grey-yellow**; winter buds yellowish or yellow-reddish, glabrous.

Blades: **Leaves lanceolate to narrowly ovate, 5-12 cm. long, abruptly long acuminate**, on slender, yellow petioles; **leaf margins crenate-serrate**, the teeth often thickened-callus/glandular, sometimes also with a pair of glands at the junction of blade and petiole; **leaves glabrous, green above and pale-glaucous below; stipules reduced to minute glandular lobes**.



Inflorescence: **Catkins on leafy branches 1.5-3 cm. long**; staminate catkins 4-7 cm. long, with 5 (4-7) stamens per flower, the filaments pubescent basally; **pistillate catkins lax, 3-7 cm. long, the rachis villose but not obscured by woolly pubescence; scales pale-tawny**, pubescent ventrally, **early deciduous; capsules glabrous**, 4-6 mm. long, **on pedicels 1-2 mm. long**, styles very short (0.2 mm.); nectaries short, yellowish-red lobes.

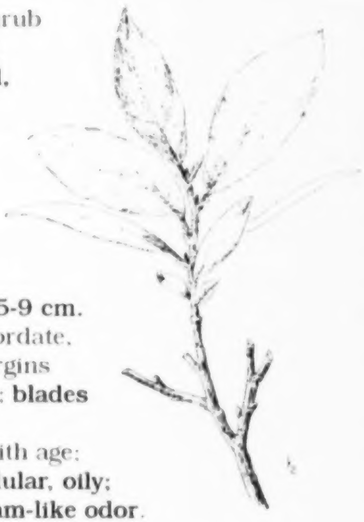
Habitat & Distribution: Common but restricted to the prairie region. Grows along rivers and streams, especially on river floodplains.

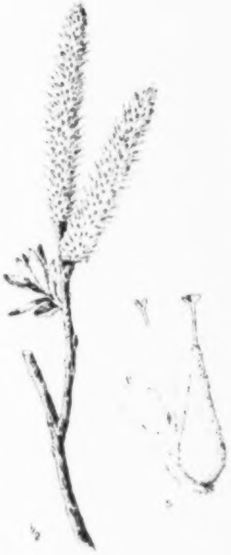
Forage Value: Good, palatable, and nutritional analysis indicating favorable protein and phosphorus levels; *S. amygdaloides* is especially important as a browse species and in providing nesting habitat and cover in the prairie region where there is often an overall scarcity of woody species; as twig ends and one-year old growth typically form the bulk of browse diet, the characteristic tree-like growth of the species can be problematic when palatable leaders are above normal browsing level.

Grazing Response: Increasers along waterways and on floodplains, rarely prominent on upland sites due to high moisture requirements.

Notes: *Amygdaloides*, originally a corruption of the Latin *amygdala*, from the Greek *amugdale*, almond, a possible reference to the leaf shape; aboriginal uses of this and other willow species were numerous (see *S. bebbiana*), relied upon rather heavily in the prairie region; willow roots were chewed and applied to horse's eyes as a supposed cure for sore, bloodshot conditions; the slender, elongate branches of peach-leaved willow lend themselves especially well for use in various woven items, and the species has been cultivated for these purposes; from an environmental perspective *S. amygdaloides* plays a major role in stabilizing soil in riparian areas, also can be used in windbreaks and shelter belts provided moisture requirements are met.

Salix barrattiana Hook. - Barratt Willow





Growth Habit:	Low, depressed or upright shrub 0.3-1.5 m. tall, often forming large mats; **branches gnarled, glossy, dark-red brown, young twigs densely woolly-hairy** and remaining so for several years; **new woody growth exudes a yellowish oil**.
Blades:	**Leaves elliptic to obovate, 3.5-9 cm. long**, the base round to subcordate, the apex obtuse to acute, margins entire or obscurely glandular; **blades grey-hairy on both surfaces**, sometimes nearly glabrous with age; **stipules evident, ovate, glandular, oily; young vegetation with a balsam-like odor**.
Inflorescence:	**Catkins sessile on previous year's growth**, appearing just before or with leaves; **bracts densely hairy, brown-black; pistillate catkins 4-11 cm. long, densely hairy**, styles 0.6-1.6 mm. long, stigmas short.
Habitat & Distribution:	Found in montane to alpine situations in the Rocky Mountains. One of our most common mountain species, often forming extensive and sometimes exclusive, matted thickets.
Forage Value:	Good, one of our larger and more productive willows in subalpine and alpine meadows that are sometimes rather barren and otherwise devoid of any quantities of browse; although the oily, fragrant new growth may decrease palatability to some extent, the species is considered palatable, moose in particular known to browse the young twigs.
Grazing Response:	An increaser.

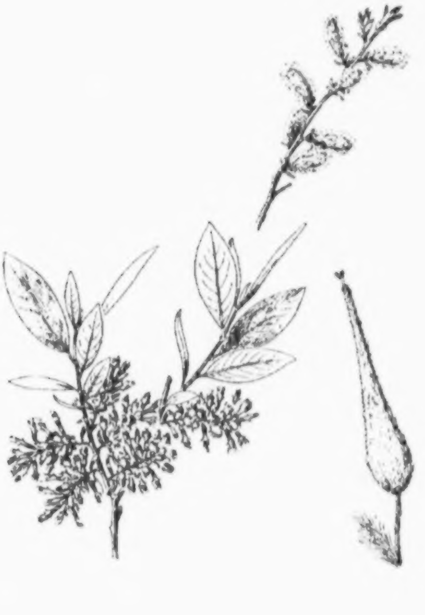
Notes: The species was named in honor of Joseph Barratt, an American who studied willows; barratt willow is ideal for reclamation projects at higher altitudes, best grown from cuttings as its frequent hybridization with associated species will interfere with seed viability.

Salix bebbiana Sarg. - Beaked Willow

Growth Habit: **Shrubs** or occasionally small trees, with several thick stems, **1-5 m. tall**; branches yellowish-brown to reddish-brown, **finely hairy, hairless at maturity**, grey; older bark grey, becoming furrowed; buds reddish-brown, finely hairy.

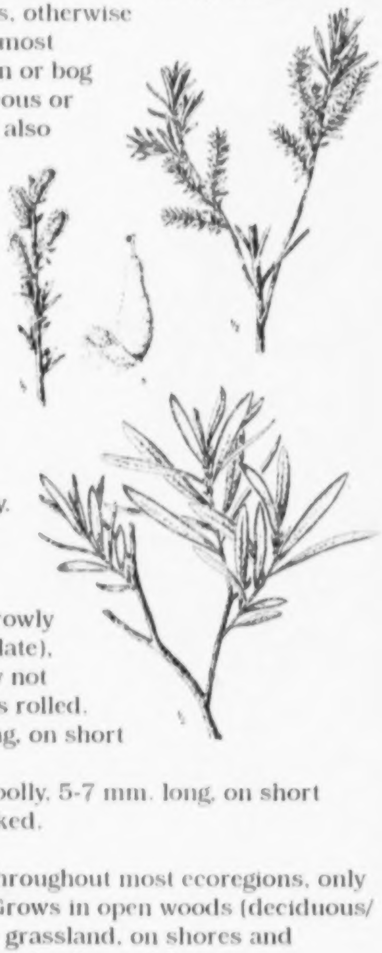
Blades: Leaves **oval-obovate**, pointed to blunt, **2-6 cm. long**, on stalks 2-8 mm. long; stipules usually small and early deciduous, larger and leaf-like on young vigorous shoots; leaf margins **entire to wavy-shallow toothed**; leaves varying from green and nearly hairless to moderately hairy above, the **lower surface pale, usually more persistently silky-hairy, also conspicuously wrinkled from raised veins.**

Inflorescence: Catkins appearing just before or with leaves, **on distinct, short leafy branches;** pistillate catkins 2-5 cm. long, rather loose; scales **yellowish-pale brown, or pale reddish-brown, sparsely hairy**, persistent; capsules **long-beaked, silky-hairy**, 6 -9 mm. long; styles short, stigmas short, barely 2-lobed.



Other Species:

1. ***Salix candida*** Fluegge *ex* Willd. - Hoary Willow
   Absent from the prairies, otherwise distributed throughout most regions. Essentially a fen or bog species, often in calcareous or moderately saline sites, also found on floodplains, in low, swampy meadows. Distinguished as follows:
   - Low growing, much branched shrubs 0.4-1.5 m. tall.
   - Young branches, buds and at least lower leaf surfaces densely white-woolly.
   - Blades wrinkled-veiny above, with some woolly hairs.
   - Leaves narrow (narrowly lanceolate-oblanceolate), 4-8 cm. long, mostly not toothed, the margins rolled.
   - Catkins to 5 cm. long, on short leafy branches.
   - Capsules densely woolly, 5-7 mm. long, on short stalks, not long-beaked.



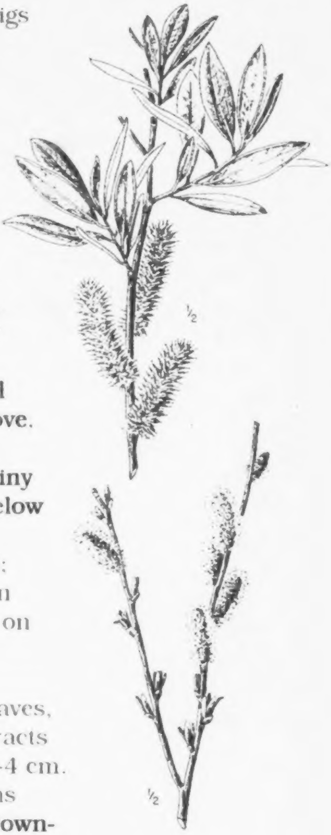
Habitat & Distribution: Common and widespread throughout most ecoregions, only occasional in the prairies. Grows in open woods (deciduous/coniferous), in moist fescue grassland, on shores and floodplains, sometimes in sandy places. Often forms extensive thickets.

Forage Value: Good, the genus as a whole rated as very nutritious, protein and phosphorus contents higher than those of most grasses and crude fiber levels of new growth relatively low; *S. bebbiana* is rated as one of our most palatable willows, browsed extensively by game (especially moose) and livestock throughout the year; in general, hairy-leaved species tend to be more palatable than those with stiff smooth foliage; willows are also an important source of food for small mammals such as beaver and porcupine, and provide valuable shelter and habitat for wildlife.

Grazing Response: Increasers, although not overly aggressive or invasive in rangeland, normally resistant to heavy browsing; severely injured or dying plants, however, are an indication of either deteriorated range condition or a very high game population.

Notes: *Salix*, the classical Latin name for willows, *bebbiana*, in honor of M. S. Bebb, an American who studied willows; the common name "beaked" refers to the long-tapered capsule; also known as Bebb's willow; the genus as whole was used rather widely by native people, the young shoots and leaves eaten, and the inner bark eaten raw or ground into flour; as with aspen, willows contain the chemical salicin, a well-known aspirin substitute, in their inner bark; leaves were applied to wounds as astringents, and teas made from bark ingested to treat irritability of the urinary tract; root infusions were taken to treat venereal disease, bruises, and internal bleeding, and roots used in a mixture with grease for dandruff; *S. bebbiana* is one of several willows known as "diamond willow", valued in furniture making, and the young flexible twigs used in woven items such as furniture and baskets; willows are valuable in stabilizing soil in moist areas, most species (*S. bebbiana* included) best suited to deep, rich soils and not tolerant of alkaline, saline or acidic conditions; however, there are a number of small bog willows that perform well in moderately acidic soils and these can be recommended for revegetation work in western and northern regions; propagation is probably most successfully accomplished by twig cuttings.

Salix drummondiana Barr. *ex* Hook. - Drummond Willow



Growth Habit: Shrubs 1-3 (4) m. tall; young twigs yellowish-greenish to brownish, finely hairy, **soon glabrous and turning dark reddish-brown to purple-black, often glaucous**; bud scale reddish-brown, finely hairy.

Blades: Leaves **narrowly elliptic to lanceolate or obovate**, 4-10 cm. long, acute, **cuneate** at the base, the margins **entire or obscurely glandular/crenate, usually revolute**; leaves **dark green, dull** and **usually sparsely woolly above**, especially on veins; leaves **pale-silvery and with a persistent shiny sericeous-woolly pubescence below** (forma *psila* Schn. has leaves essentially glabrous at maturity); stipules small glandular lobes on older stems, larger and leaf-like on new growth.

Inflorescence: Catkins appearing just before leaves, **sessile**, sometimes with a few bracts at the base; staminate catkins 2-4 cm. long, stamens 2; pistillate catkins **3-8 cm. long**, the scales **dark brown-blackish**, long hairy; capsules 3-6 mm. long, **not long beaked**, on short pedicels (to 1.5 mm.), **densely sericeous**; styles 0.6-1.3 mm. long, the stigmas 0.2-0.6 mm. long, usually undivided.

Habitat & Distribution: Frequent in the Rocky Mountain and boreal forest regions. Grows in moist or swampy woods and thickets, on shores, gravelly river banks and floodplains, also in moist areas in montane to subalpine habitats.

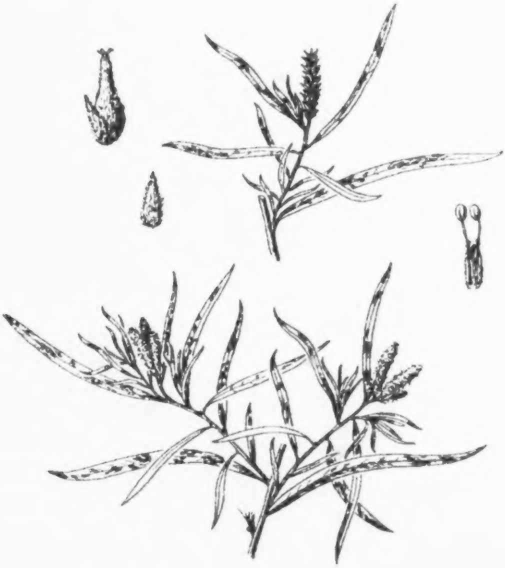
Forage Value: Good, nutritious and generally palatable, although rating somewhat below choice species such as *S. glauca*, *S. pseudomonticola*, and dogwood (*Cornus canadensis*).

Grazing Response: An increaser; except in situations where browsing pressure is excessive, willows are well adapted to survive close and continuous use which results in a dense, bushy growth habit that will protect at least some of the inner twigs and foliage.

Notes: Syn. *S. subcoerula*; historically *S. drummondiana* was rather widely used by native people for a variety of purposes, often occurring in abundance in centres of human activity in both northern and montane regions; drummond willow is a pioneer following mechanical disturbance and fire, also on shores and floodplains, where the successional process is often naturally fluctuating due to seasonal or periodic flooding.

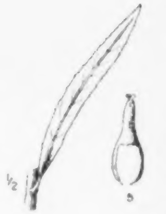
Salix exigua Nutt. - Sand Willow

Growth Habit:	**Slender shrubs** or occasionally larger and tree-like. **2-4 (8) m. tall, usually forming colonies, spreading by extensive creeping rhizomes**; twigs **elongate, thin**, little branched, **yellowish-green to reddish**, finely hairy, soon hairless, reddish-brown to grey; bud scale yellowish-red, finely hairy to hairless.
Blades:	Leaves **linear, the sides parallel, pointed at both ends**, 5-15 cm. long, the margins **entire or more often shallowly toothed with callus teeth**, on stalks to 5 mm. long; blades **green on both sides, not pale or glaucous below**, varying from persistently silvery-silky-hairy to hairless at maturity; stipules linear, early deciduous.
Inflorescence:	Catkins appearing with or just after leaves, borne **on leafy branches**, the first in axils, later ones developing on current year's growth; pistillate catkins 1-7 cm. long, on branches 2-5 cm. long; scales **pale-tawny, early deciduous**; capsules 3-7 mm. long, **usually hairless**, sometimes thinly silky hairy, stalkless or on short stalks to about 1 mm. long; styles obsolete, the stigmas short, thick.



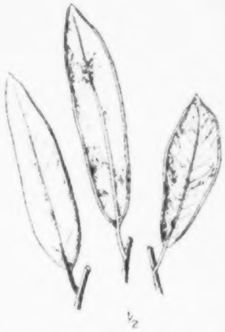
Similar Species:

1. ***Salix melanopsis*** Nutt. - Willow
   A frequent species in montane regions, found along streams, on floodplains. Differs as follows:
   - Branches darker, grey-red brown.
   - Leaves somewhat broader, their sides not parallel.
   - Lower leaf surface often paler (rarely somewhat glaucous).
   - Styles short but present.



Habitat & Distribution:

Common throughout most regions. Grows in wet to moist places on alluvial soils along streams and rivers, on floodplains, on lake shores and around sloughs, sometimes in sandy grassland or dunes with an elevated water table.



Forage Value:

Good, similar nutritionally to other willows; although readily browsed, *S. exigua* ranks with other species with smooth twigs and leaves as one of the less palatable willows; as well, because it frequently associates with choice species such as red osier dogwood, utilization will naturally be lighter.

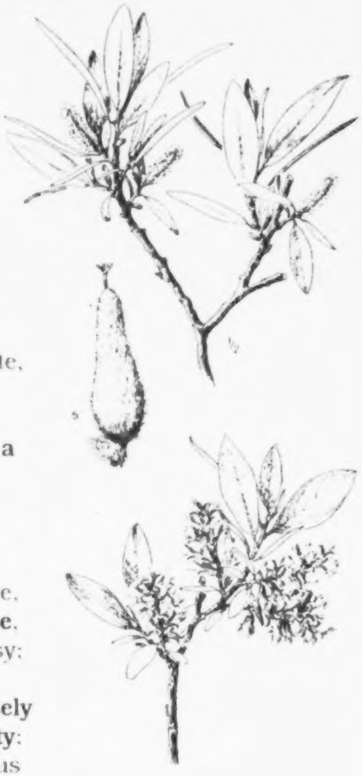
Grazing Response:

An increaser; along with *S. melanopsis*, our only rhizomatous willows, capable of spreading quickly and forming extensive colonies; however, the species are restricted in habitat because of high moisture requirements, and consequently are not problematic in upland rangelands.

Notes:

Syn. *S. interior*; also known as narrow-leaf willow; *S. exigua* has both medicinal and commercial value similar to other willows, but the long, flexible branches were especially well suited for use in basketry, weaving and in the construction of back rests and sweat lodges; *S. exigua* is of particular importance as a reclamation species, often a natural pioneer on disturbances along waterways, having the ability to spread rapidly by vegetative means and form dense colonies; it functions as an early successional species, showing a decline once climax trees and shrubs become established; unlike other willows, propagation methods can include rhizome as well as twig cuttings.

Salix glauca L. var. *villosa* (Hook.) Anderss. - Smooth Willow



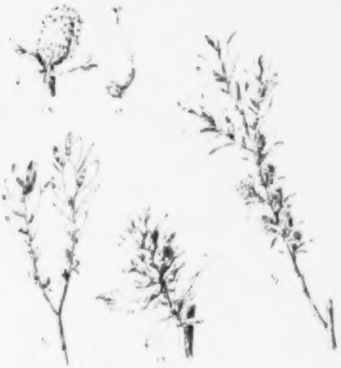
Growth Habit: Mostly erect, branching shrubs **0.5-1.5 (2) m. tall**; twigs dark reddish, but **usually obscured by tomentose-villose pubescence, becoming greyish, glabrous**, the thin **epidermal layer often readily exfoliating**; bud scale reddish-brown, hairy.

Blades: Leaves **elliptic to obovate or oblanceolate**, the base cuneate, the apex **acute to obtuse, 2-5 cm. long**, the margins **essentially entire, often with a few remote glandular teeth**; blades on yellowish-brown petioles 3-9 mm. long, these **3 or more times as long as buds**; leaves dark green above, **moderately to sparsely villose**, sometimes subglabrous-glossy; lower surface **pale-glaucous, from rather densely to sparsely pubescent**, the hairs **not rusty**; stipules small, early deciduous (larger on new growth).

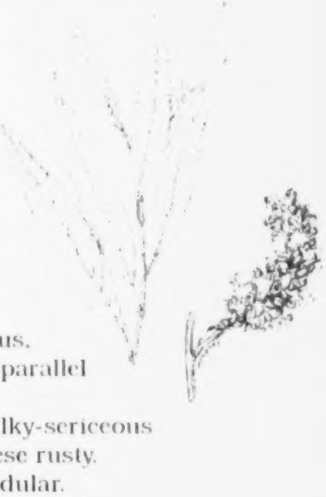
Inflorescence: Catkins appearing with leaves, on short leafy branches; staminate catkins 1-3 cm. long, stamens 2; pistillate catkins **2-5 (6) cm. long, elongate**, the scales tawny-brownish, pubescent, persistent; capsules 3-8 mm. long, **not long-beaked, villose-woolly**, on distinct stipes **0.5-1.6 mm. long**; styles **0.5-0.8 mm. long**, yellowish-green, the stigmas shorter, bilobed; nectaries 1.

Similar Species:

1. ***Salix brachycarpa*** Nutt. - Short-capsuled Willow
   Frequent in the foothills/Rocky Mountain region, also in the parkland in a few locations and a disjunct population in the northern boreal region. Found along streams and rivers, especially on floodplains, also in marshy places and fens.
   Differs as follows:
   - Lower growing, 0.3-1.5 m. tall.
   - Blades on short, reddish petioles (1-3 mm.), these less than 3 times as long as the buds.
   - Leaves often more densely pubescent at maturity.
   - Pistillate catkins 1-2 cm. long, short-cylindric to subglobose.
   - Capsules sessile, the styles averaging slightly longer (0.6-1.2 mm.).
   - Pistils longer-beaked and subglabrous in var. *glabellicarpa* Schneid.

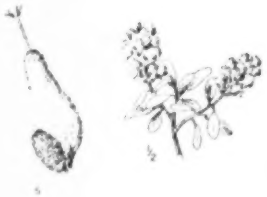


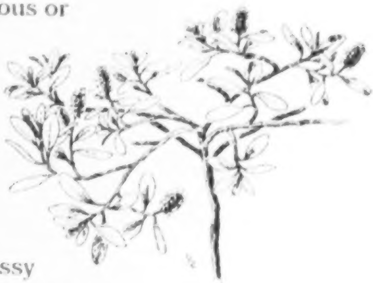
2. ***Salix arbusculoides*** Anderss. - Shrubby Willow
   Frequent in the boreal forest and foothills regions. Grows along streams, on floodplains, in fens and bogs.
   Differs as follows:
   - Plants 1-4 m. tall, or sometimes to 6 m.
   - Young twigs sparsely felty-hairy, becoming reddish-brown, glabrous, distinctly glossy.
   - Blades often narrower, acute at the apex, the margins conspicuously glandular-serrulate.
   - Upper leaf surface glabrous, glossy, with paler, closely parallel veins.
   - Lower leaf surface with silky-sericeous hairs, at least some of these rusty.
   - Stipules often larger, glandular.
   - Capsules with white and rusty hairs.
   - Stipes 0.6-0.9 mm. long.



3. ***Salix arctica*** Pallas - Arctic Willow

Rather common but restricted in its range to subalpine and alpine situations in the Rocky Mountains. Grows in meadows, on moist slopes. Distinguished as follows:





- Dwarf creeping shrubs, mat-forming, to 3 cm. tall.
- Twigs reddish, glabrous or nearly so, often glaucous, rooting at the nodes.
- Leaves extremely variable, on average obovate to elliptic, 2-7.5 cm. long.
- Blades green and glossy above, glabrous, the lower surface pale, often sparsely hairy, petioles evident.
- Stomata evident on upper leaf surfaces.
- Stipules essentially lacking or to 2 mm. long.
- Catkins on leafy branches, the pistillate 2-7 cm. long.
- Bracts dark-tipped, hairy.
- Pistils pubescent, stipes 0.6 mm. long, styles to 2 mm. long, red.

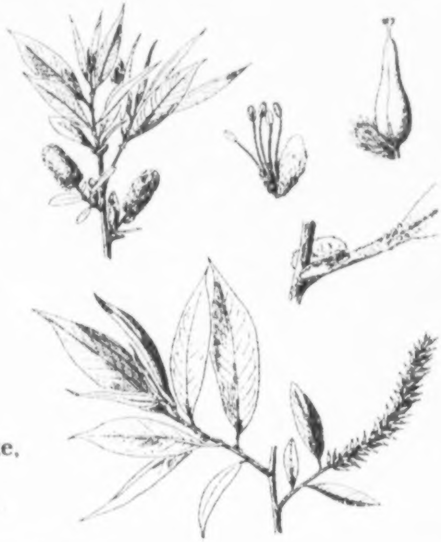
Habitat & Distribution: Very common in the foothills/southern Rocky Mountain regions, scattered throughout the boreal forest. Grows in moist woods and thickets, along rivers and streams, on floodplains, in boggy places and muskegs.

Forage Value: Good, one of our most palatable willows, also often abundant and usually growing within reach of browsing animals; smaller species such as *S. arctica* and *S. brachycarpa* produce considerably less biomass, also are sometimes inaccessible to wildlife at least part of the year due to wetland habitat and snowfall accumulations.

Grazing Response: Increasers, severely injured plants and high mortality an indication of excessive browsing pressure.

Notes: Also known as greyleaf willow; *S. glauca* can be recommended as an early successional species along streams and in boggy areas; it is adapted to a rather wide range of soil conditions and is one of our more acid tolerant willows.

Salix lucida Muhl. ssp. ***lasiandra*** (Benth.) Argus - Shining Willow



Growth Habit: **Large shrubs/small trees 2-9 m. tall,** the stems several, **often thick**; young twigs **yellowish to reddish-brown, finely hairy but soon hairless**, brownish; bark grey, smooth, or becoming fissured in old trees; bud scale yellow or reddish-brown, hairless to sparsely hairy.

Blades: Leaves **ovate-lanceolate, 6-15 cm. long, long-pointed or sometimes merely pointed**, the **margins distinctly glandular toothed**; stalks finely hairy, 3-10 mm. long, **with glands at the upper end at the junction with the blade**; blades **green and hairless, often glossy above, glaucous and mostly hairless below**; stomata absent from upper surface, stipules **leaf-like, well developed**, rounded, with glandular margins.

Inflorescence: Catkins appearing with leaves, **on leafy branches**; pistillate catkins **3-12 cm. long, the axis moderately spreading-long-hairy**, the scales **pale-tawny, jagged, early deciduous**; capsules 4-8 mm. long, hairless, tawny, **on short stalks about 1 mm. long**; styles short (0.5 mm.), the stigmas lobed.

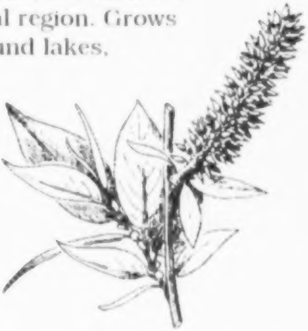
Related Species:

1. Ssp. ***caudata*** (Nutt.) Argus
   Found in generally the same habitats, and probably also widely distributed.
   Differs as follows:
   - Leaves narrower, usually narrowly ovate.
   - Stomata present on both leaf surfaces.
   - Leaves green and not glaucous below, although somewhat paler.

Other

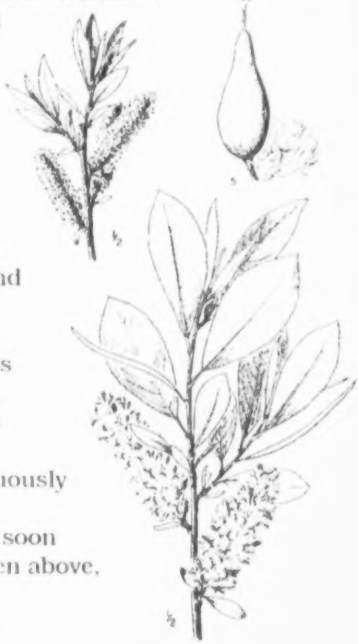
Species:

1. ***Salix lutea*** Nutt. - Yellow Willow
Frequent, found in all ecoregions, absent from portions of the northern boreal region. Grows along streams and rivers, around lakes, also in active dunes where moisture is adequate.
Distinguished as follows:



- Shrubs, rarely trees 2-4 (9) m. tall.
- Young branches slender, elongate, hairless, reddish, turning yellow-grey.
- Leaves oval-lanceolate, 4-10 cm. long, pointed to abruptly long-pointed, the bases sometimes rounded-heart-shaped.
- Leaf margins mostly not toothed.
- Young leaves reddish, hairy above, becoming hairless, yellow-green above, pale below.
- Stipules evident, at least on young growth.
- Catkins stalkless, 3-12 cm. long, the axis densely woolly.
- Capsules hairless, on long stalks (1.5-4 mm.).
- Scales pale-tawny, not early deciduous.

2. ***Salix pseudomonticola*** Ball - Mountain Willow
Widely distributed, most common in the foothills and boreal forest regions. Grows in moist woods and thickets, on shores, in swampy and boggy places.
Distinguished as follows:



- Shrubs 1-4 m. tall.
- Twigs yellowish-reddish-brown, finely hairy, soon hairless and glossy-red brown.
- Leaves oval-obovate, 4-8 cm. long, the bases rounded to somewhat heart-shaped, the tips pointed.
- Leaf margins conspicuously glandular-toothed.
- Young leaves reddish, soon hairless and dark green above, glaucous below.
- Stipules conspicuous.

- Catkins mostly stalkless, 3-9 cm. long.
- Scales dark brown-black.
- Capsules on short stalks (to 1.5 mm.), 4-5 mm. long, hairless.

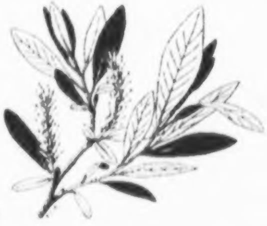
Habitat & Distribution: Occasional, widely distributed throughout most ecoregions. Grows along streams and rivers, around sloughs and ponds, on river floodplains and on sand and silt bars.

Forage Value: Good, plants nutritious, both *S. lucida* and *lutea* with somewhat inferior palatability, *S. pseudomonticola* more heavily utilized by both game and livestock.

Grazing Response: Increasers, all species tolerant of heavy browsing, but *S. pseudomonticola* often severely damaged by over utilization.

Notes: Syn. *S. lasiandra*, *lucid* translating bright or clear; as well as traditional uses for food and medicine (See *S. bebbiana*), willows were used in place names of native people, Mosquito Creek, Alberta once called White Willow, and Willow Round, Montana, traditionally called Wide Willow Flat, also Willow Creek, Alberta; both *S. lutea* and *S. lucida*, because of their characteristic tree-like growth habit, have potential both as ornamentals and for wind breaks and shelter belts; all three species are recommended for reclaiming and stabilizing moist, disturbed soils.

Salix maccalliana Rowlee - Velvet-fruited Willow



Growth Habit: Branching shrubs **1-5 m. tall**; twigs **dark reddish-brown**, finely hairy but **soon glossy and glabrous**; buds red, glossy, glabrous.

Blades: Leaves **elliptic to oblong, 4.5-7 cm. long, acute**, the bases **cuneate to rounded**; leaf margins **conspicuously glandular-serrate crenate**; blades **firm at maturity, green on both sides (not pale-glaucous), mostly glabrous at maturity** except for petioles (above) and upper midribs; stipules small, glandular, except on young shoots.

Inflorescence: Catkins borne **on short leafy branches**, the rachis villose; scales tawny-greenish-brown, villose, persistent; stamens 2; pistillate catkins 2-6 cm. long, the capsules **obscured by dense villose pubescence, to 8 mm. long**, on pedicels about equalling scales in length (1-2 mm.); styles 0.8-1.2 mm. long, stigmas bifid.

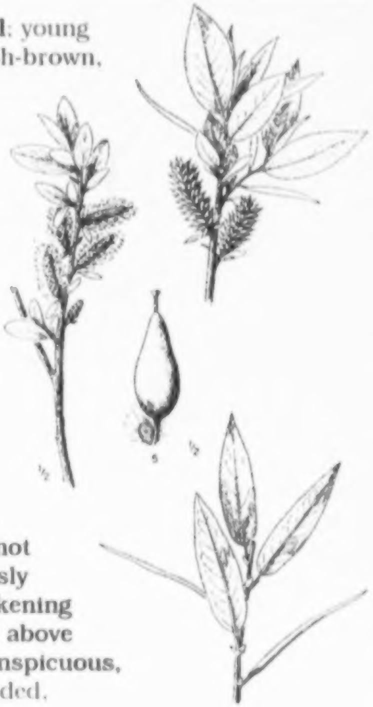
Habitat & Distribution: Locally abundant in the foothills/Rocky Mountain and boreal forest regions, also in Cypress Hills. Grows in moist places: in swampy, boggy areas, in wet thickets and meadows, along streams and rivers, around sloughs.

Forage Value: Good, nutritional levels similar to those of *S. bebbiana*; *S. maccalliana* is one of our more palatable willows, browsed readily and also often abundant, thus providing appreciable amounts of forage.

Grazing Response: An increaser, but often browsed severely as it frequently occurs in primary moose habitat, and consequently often declines in vigor and cover values.

Notes: As the common name implies, *S. maccalliana* can be identified by its conspicuous, velvety-hairy capsules; the distinct, dark red twigs are prized for making small furniture and baskets, sometimes combined with species of contrasting color such as *S. scouleriana* and *S. exigua*; a robust and vigorous species, velvet-fruited willow is important in northern and western regions in providing cover in boggy areas and for stabilizing loose, wet soil along streams.

Salix myrtillifolia Anderss. var. ***cordata*** (Anderss.) Dorn - Myrtle-leaved Willow; Blueberry Willow



Growth Habit: Branching shrubs **1-4 m. tall**; young branches yellowish to reddish-brown, short-hairy, becoming glabrous and red-brown to grey; buds reddish-brown, hairy.

Blades: Blades **narrowly elliptic-obovate, 3-6 cm. long**, the apex **round-acutish**, the base **rounded**; leaf margins **evidently glandular-serrate/crenate**; petioles short, **finely hairy; young leaves hairy**, the **mature leaves with remnant pubescence on upper midrib**; blades **green above, somewhat paler but not glaucous below, conspicuously reticulate veined, often blackening when dried**; stomata evident **above and below**; stipules **often conspicuous, 1-5 mm. long**, the apex rounded, glandular-toothed.

Inflorescence: Catkins on leafy branches, the staminate 1-2 cm. long, stamens 2, filaments distinct, glabrous; pistillate catkins 2-4 cm. long, the axis sparsely pubescent; scales glabrous to sparsely pubescent, **dark brown/black at the tip, paler at the base**, persistent; capsules **glabrous**, 3-6 mm. long, on short pedicels (to 1 mm. long); styles 0.4-0.9 mm. long, the stigmas short, thick, scarcely bilobed; nectaries 1.

Varieties:

1. Var. ***myrtillifolia***
   Common in the boreal forest, with some occurrences in the foothills/Rocky Mountain region. Grows in moist woods, on shores, and is especially common in fens and bogs, where often associated with *Picea mariana*. Differs as follows:
   - Plants low, the stems often reclining or trailing, rooting, 0.1-1 m. tall.

- Blades only 1-3 cm. long, the apex rounded.
- Blades glabrous, even when young.
- Stomata only present on lower leaf surface.
- Stipules smaller, 0.2-2 mm. long, rounded, usually early deciduous.
- Styles shorter, 0.3-0.5 mm. long.

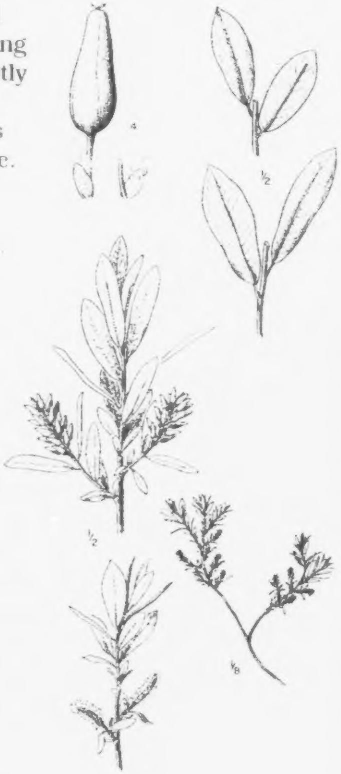
Habitat & Distribution: Common in the foothills/Rocky Mountain regions where found in moist woods and thickets, on shores, in wet meadows.

Forage Value: Good; palatability is generally favorable but tends to fall somewhat below that of choice species such as *S. glauca* and *S. farriae* with which it often associates; the larger var. *cordata* furnishes considerably more forage than var. *myrtillifolia*.

Grazing Response: An increaser.

Notes: The common name alludes to the resemblance of leaves, particularly of the smaller variety, to those of certain blueberry species; *S. myrtillifolia* has medicinal properties similar to those of other willows, the most well known of these being a high content of salicin which has aspirin-like qualities; both varieties are important early successional species following clearing and burning, var. *cordata* best adapted to moist wooded areas, var. *myrtillifolia* useful in acid, nutrient-poor bogs where many other species would have difficulty surviving.

Salix pedicellaris Pursh - Bog Willow



Growth Habit: **Low**, rather sparingly branched shrubs, **2-12 (15) dm. tall**; young twigs dark reddish-brown, mostly glabrous or finely hairy, soon completely glabrous, grey; buds mostly glabrous, reddish-purple.

Blades: Blades **elliptic-obovate or oblong**, 2-5 cm. long, the apex **obtuse to rounded**, the base rounded-cuneate; leaf margins **entire, sometimes obscurely revolute**; leaves **thick and leathery, glabrous (including on midrib), pale green and slightly glaucous above, paler-glaucous below**; veins rather **close and numerous**; petioles **very short**, they and the midrib **pale-tawny**; stipules essentially **obsolete**.

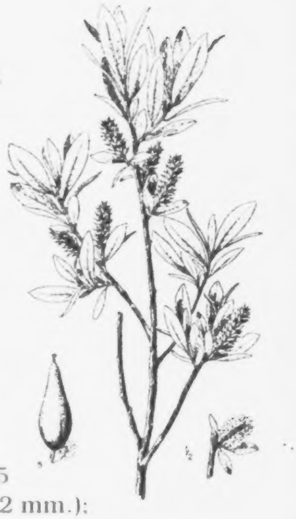
Inflorescence: Catkins appearing with leaves, **on leafy branches**, the rachis sparsely villose; scales persistent, yellowish, often purple-tinged, glabrous externally except sometimes at the tip, pubescent within, at least near the tip; staminate catkins slender, 1-2 cm. long, stamens 2; pistillate catkins 1.5-3.5 cm. long, rather loose; capsules **tawny and often purple-tinged, glabrous**, 5-7 mm. long, on well developed stipes **2-3 mm. long**; styles **short and stout** (0.1-0.3 mm. long), the stigmas very short, bifid.

Similar Species:

1. ***Salix farriae*** Ball - Willow
   Common in the foothills/Rocky Mountain region. Also in a few localities northward. Grows from lower elevations into alpine areas. Found on shores and stream banks, on floodplains, in wet meadows and moist woods.

Differs as follows:

- Small shrubs, to 2 m. tall.
- Young twigs yellowish, turning dark reddish-brown.
- Blades elliptic-obovate (not oblong), apex acute.
- Leaf margins entire to obscurely glandular-serrate.
- Blades not glaucous above, the veins not close and numerous.
- Blades essentially glabrous but petioles and midribs, at least above, with erect white and rusty hairs.
- Bracts tawny, with dark tips.
- Capsule stipes shorter (0.8-1.5 mm.) and styles longer (0.4-1.2 mm.); capsules glabrous.

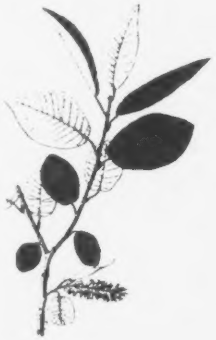


2. ***Salix pyrifolia*** Anderss. - Balsam Willow

Locally abundant in the boreal forest. Found in moist woods, on shores, in muskegs and boggy woods, in sand dune slacks.

Differs as follows:

- Blades elliptic-obovate, the bases usually asymmetrical, cordate.
- Leaf margins obscurely glandular toothed to subentire.
- Young leaves thin and reddish, older blades thicker and distinctly reticulate-rugose.
- Petioles yellowish to reddish, glands often present at base of blades.
- Stipules small, early deciduous.
- Catkins on leafy branches.
- Capsules glabrous, on long (to 2.8 mm.) stipes.



Habitat & Distribution: A species of fens, sphagnum bogs. Found in all ecoregions except the prairies and parkland.

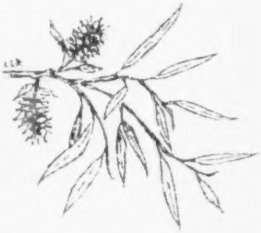
Forage Value: Good, *S. farriae* is one of our more palatable willows. *S. pedicellaris* less productive, less palatable due to stiff, rather leathery foliage, and sometimes inaccessible because of habitat and peripheral distribution patterns.

Grazing Response: Increasers.

Notes:

Typical of the genus, all three mentioned willows are valued for their soil building and binding properties, responding as early successional species following mechanical disturbance and fire; both *S. pedicellaris* and *S. pyrifolia* are well adapted throughout the boreal forest, *S. farriae* mostly restricted to western regions; of the three species, *S. pedicellaris* is most tolerant of saturated, nutrient-poor sites.

Salix petiolaris J.E. Smith - Basket Willow



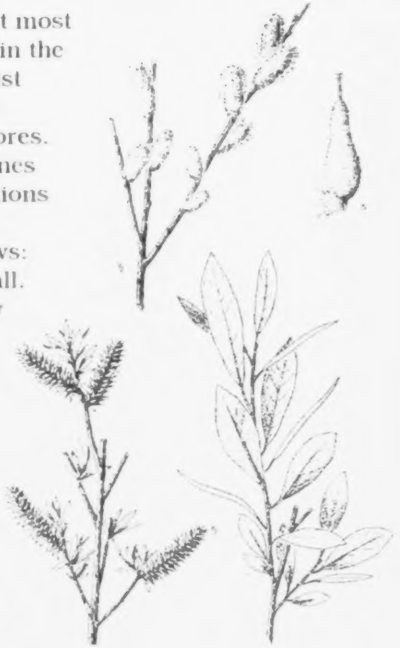
Growth Habit: Shrubs or trees **1.5-5 (6.5) m. tall**; branches dark red-brown, **purplish when dry**; young branches yellowish to red-brown, **velvety but soon rather sparsely hairy**.

Blades: Leaves **narrowly oval, narrowed at both ends, 5-10 cm. long**; leaf margins **glandular-toothed**; young leaves **silky-hairy with white and rusty hairs**, often mostly hairless at maturity, glaucous below; stipules very small.

Inflorescence: Catkins appearing just before or with leaves, **on short leafy branches** that fall with them; bracts **light brown to brown-black**, silky-hairy; pistillate catkins **short**, nearly spherical to short-cylindric, rather loosely flowered, **1-3 cm. long**; capsules **long-beaked, silky-hairy**, on stalks 2-4 mm. long; styles very short.

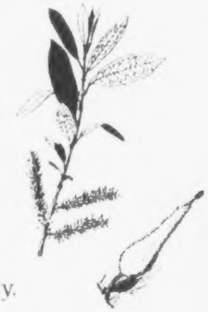
Other Species:

1. *Salix planifolia* Pursh ssp. *planifolia* - Flat-leaved Willow
   Distributed throughout most regions, less common in the prairies. Grows in moist thickets, in boggy and swampy places, on shores. Also found in sand dunes where moisture conditions are favorable.
   Distinguished as follows:
   - Shrubs 0.5-4 m. tall.
   - Young twigs mostly hairless, glossy, reddish-brown to purplish.
   - Blades oval-oblanceolate, 2.5-5 cm. long.
   - Leaf margins mostly not toothed.
   - Leaf veins closely spaced, parallel.



- Upper leaf surface hairless, dark green, glossy; glaucous, and somewhat silky with white and rusty hairs below.
- Catkins nearly stalkless, 2-6 cm. long, compact, the axis and scales hairy, scales blackish.
- Capsules not long-beaked, on very short stalks (less than 1 mm.), silky-hairy.

2. ***Salix discolor*** Muhl. - Pussy Willow; Diamond Willow
   Found throughout most regions, absent from the northern boreal region, uncommon in the prairies. Grows in moist thickets, open woods, around sloughs, on shores.
   Differs from *S. planifolia*:
   - Shrubs varying from 2-10 m. tall.
   - Blades elliptic-obovate, often larger (4-10 cm. long), the margins often toothed or wavy.
   - Leaves not highly glossy above.
   - Leaf veins widely spaced, irregular, veins and petioles above often with remnant hairs at maturity.
   - Catkins longer (to 8 cm.).
   - Capsules long-beaked, on longer stalks (2-2.5 mm.).



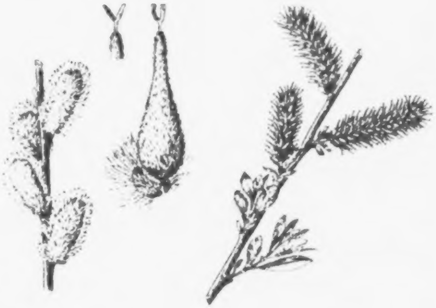
Habitat & Distribution: Frequent in the parkland region, also present in the foothills and boreal forest ecoregions. Grows around sloughs, where often forming thickets, on shores, in moist meadows.

Forage Value: Good, nutritional elements similar to those of other willows; plants are palatable, but when growing with choice species such as *S. bebbiana*, browsing is minimal unless food supplies become scarce; *S. planifolia* has a similar rating, *S. discolor* tends to be more palatable.

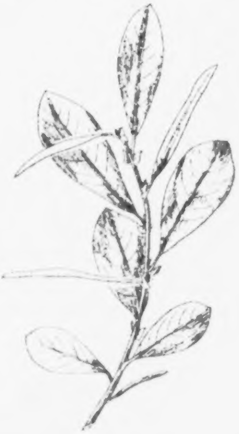
Grazing Response: Increasers, but high moisture requirements tend to restrict population occurrences; tolerance of heavy browsing pressure is high.

Notes: *S. discolor*, as the common name implies, is an important source of "diamond willow" used in making small furniture and lamps; as well as the traditional uses of the species for food and medicinal purposes, spring buds were used by native people to produce a red dye; the above mentioned species are about equally valued for providing cover and in stabilizing disturbed soil. *S. petiolaris* and *discolor* particularly well adapted to prairie and parkland regions, *S. planifolia* best suited to regions with better moisture conditions.

Salix scouleriana Barr. *ex* Hook. - Scouler's Willow



Growth Habit: **Large shrubs or small trees 3-12 m. tall**, the trunks several, **up to 1 dm. thick**, sometimes thicker in trees; young twigs **stout, yellowish to greenish-brown, densely velvety** when young, often remaining so for 2-3 years; older branches turning reddish-brown, becoming hairless with age; bark **grey, smooth**, becoming dark brown, ridged; buds yellowish-brown, sparsely to densely velvety.



Blades: Leaves **narrowly oval-obovate, 4-8 cm. long**, the **bases distinctly wedge-shaped, the top rounded**, sometimes broadly pointed; leaf margins **entire to obscurely glandular toothed, often slightly rolled**; leaves **velvety when young with white and rusty hairs, becoming mostly hairless and dark green above, pale-glaucous** and **nearly hairless or more often silky-hairy below**; stalks short, tawny, velvety, extending into pale midribs; stipules usually very small and early deciduous (leaf-like on young shoots).

Inflorescence: Catkins appearing before or with first leaves, **stalkless or nearly stalkless with short reduced bracts**, pistillate catkins 2.5-6 (7) cm. long, **dense**, **sometimes drooping**, the scales dark brown-black, long hairy; capsules 5-8 mm. long, **narrow, long-beaked, densely grey silky-hairy**, on short (0.8-2 mm.) stalks; styles short, 0.2-0.7 mm. long.

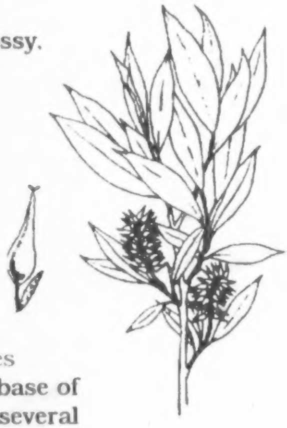
Habitat & Distribution: Found in all regions except the prairies. Especially common in the foothills. Grows in rather dry upland coniferous forests, in clearings and burned over areas. Also grows in moister sites: on sandy shores, floodplains, on stream banks. Found in active sand dunes in the northern boreal forest.

Forage Value: Good, the leaves and twigs nutritious and considered among the most palatable willows; utilization by both livestock and game is high, the species especially heavily browsed by moose throughout the year.

Grazing Response: An increaser, aggressive on disturbances and logged-out and burned-over areas; although resistant to browsing, *S. scouleriana* is used so extensively (bark included) that severe injury often results in a decline in populations.

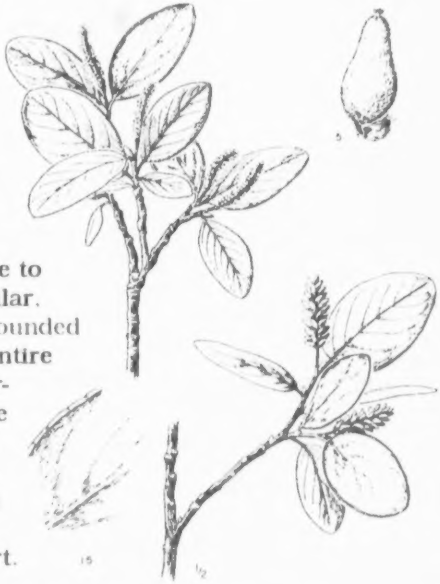
Notes: Named for John Scouler (1804-71), a Scotch naturalist who discovered the species; often called fire willow because of its tendency to invade old burns; medicinal properties are similar to those of other willows (see *S. bebbiana*). *S. scouleriana* also a source of "diamond" wood for carvings and furniture; Scouler's willow is one of our most acid tolerant willows, and as such is valuable in providing cover in western and northern regions; as with other *Salix* species, it is not shade tolerant, often occurring in open forests but not persisting once conifers establish.

Salix serissima (Bailey) Fern. - Autumn Willow



Growth Habit:	Medium shrubs, 1-4 m. tall; young twigs glabrous, yellowish-brown, **glossy**, becoming grey-brown with age, the epidermal layer exfoliating.
Blades:	**Leaves elliptic-narrowly elliptic, 5-9 cm. long, the apex acute to short-acuminate**, the base acute to obtuse, the **margins distinctly glandular-serrate, young leaves glabrous, reddish, becoming thick, dark green above, pale and often glaucous beneath**; petioles 6-10 mm. long, **glandular near the base of blades; stipules reduced to one or several minute glands**.
Inflorescence:	Catkins appearing after leaves and **maturing in late summer, short-cylindrical**, 2-4 cm. long, on leafy branches; **bracts pale-tawny, the pistillate densely sericeous, deciduous after flowering**; stamens 3-6, the filaments basally pubescent; **capsules 7-9 mm. long, yellowish-brown and red-tinged at maturity, firm and rough-rugulose**; styles and stigmas short, stipes 0.8-1.5 mm. long; nectaries cup-like and divided into 2-4 segments surrounding the stipes.
Habitat & Distribution:	Occasional throughout most regions. Absent from drier prairie areas. Found in swampy areas, around sloughs and in fens, in wet meadows and thickets, on shores.
Forage Value:	Good, but with a palatability rating somewhat below that of species with thinner, more pubescent foliage.
Grazing Response:	An increaser.
Notes:	As the common name suggests, *S. serissima* matures late in the season, and can be readily identified by the persistent, firm reddish-roughened capsules; although often sporadic in its occurrences, autumn willow is exceptionally widely distributed in all but driest regions, valued throughout its range as a pioneer following disturbance.

Salix vestita Pursh - Willow



Growth Habit:	**Low-growing shrubs** to 1.5 m. tall; branches grey-brown, the **older bark ridged and leathery**, mostly glabrous, **internodes typically short**.
Blades:	**Leaves elliptic, obovate to more rarely suborbicular**, 1.8-7 cm. long, **firm**, rounded at both ends, **mostly entire to obscurely glandular-toothed; upper surface dark green, glabrous, often reticulate, lower surface pale and often hairy, petioles glandular-dotted, short**.
Inflorescence:	**Catkins terminate 3-leaved branches, the pistillate 2.5-6 cm. long**, the bracts densely hairy; **capsules densely hairy, ovate**; stipes 0.4-1.2 mm. long, with several nectaries.
Habitat & Distribution:	Common at subalpine/alpine elevations in the Rocky Mountains along streams and in open woods.
Forage Value:	Fair, leaves and young twigs readily browsed in cases where there is a general shortage of forage, but the species ranking among our less important willows, inferior in palatability and with limited productivity.
Grazing Response:	An increaser.
Notes:	*S. vestita*, as with other high altitude willows, typically grows on loose gravelly soils where vegetation cover is normally rather sparse and where steep slopes are often prevalent; in these cases, willows are highly valued for their soil binding properties and in watershed protection; *S. vestita*, one of our most ornamental willows, can be successfully propagated by cuttings for use in cool shaded gardens and for reclamation projects at higher altitudes.

BETULACEAE - Birch Family

Common Characteristics

- Deciduous shrubs or trees, male and female flowers on same plant.
- Buds axillary, not terminal.
- Leaves alternate, simple, usually conspicuously toothed.
- Flowers in catkins, these usually expanding before leaves.
- Staminate flowers in spirally arranged clusters, each cluster with bracts.
- Pistillate catkins erect to drooping, either elongate or short.
- Fruit a large nut enclosed in an involucre of enlarged bracts or a small 1-seeded winged nutlet.

Key to Betulaceae

1. Staminate flowers mostly solitary in axils of catkin bracts; pistillate catkins short; fruit a nut enclosed in a long-beaked bristly involucre. *Corylus*

Staminate flowers mostly in 3's; pistillate catkins elongate; fruit a nutlet, this often winged. **2**

2. Pistillate catkins with thin, 3-lobed bracts, these early deciduous, stamens 2. *Betula*

Pistillate catkins cone-like, the bracts woody, persistent, stamens 4. *Alnus*

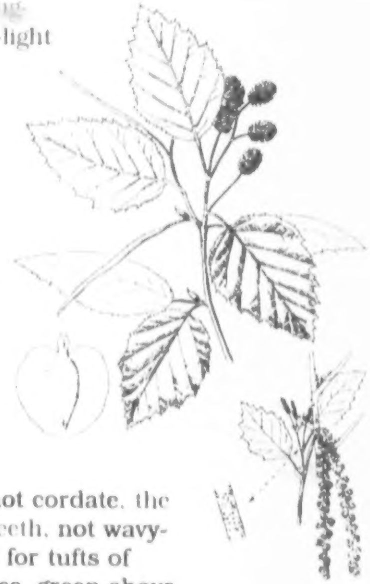
ALNUS Hill. - Alder

Key To Alnus

1. Tall shrub or small tree; leaf buds stalked, with 2-3 nearly equal scales; leaves dull and distinctly lobed; flowering before leaf expansion; nutlets margined but without wings. *A. tenuifolia*

Shrubs; leaf buds sessile, covered by several scales of unequal length (or scales imbricate); leaves glossy, toothed but scarcely lobed; nutlets with broad wings. *A. crispa*

Alnus crispa (Ait.) Pursh ssp. ***crispa*** - Green Alder



Growth Habit: Shrubs to 3 m. tall, ascending-spreading, bushy; bark grey-light grey, smooth, thin; young twigs and flower stalks finely glandular hairy, somewhat glutinous, red-brown, becoming hairless, grey; buds stalkless, pointed, 6-10 mm. long, with overlapping red-brown hair-fringed scales of various lengths.

Blades: Leaves on short stalks, 2-10 cm. long, rather thick, ovate-oval, short pointed, the bases rounded to wedge-shaped, not cordate, the margins toothed, with long teeth, not wavy-lobed; leaves hairless except for tufts of hairs in axils on lower surface, green above, paler beneath, glossy, somewhat resinous sticky, especially when young.

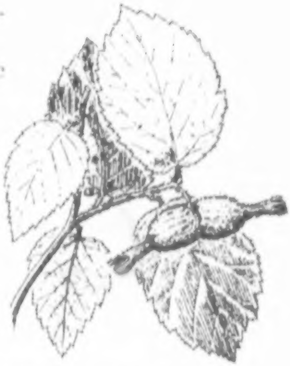
Inflorescence: Catkins appearing with leaves, the staminate to 7.5 cm. long, with glutinous reddish scales and yellow stamens; pistillate cones 10-15 mm. long, long-stalked, bracts hardened, dark brown; nutlets flattened, with two broad wings.

Related Species:

1. Ssp. ***sinuata*** (Regel) Hult.
   Actual range of this subspecies is not clearly defined, but it appears to be the most common and widespread.
   Differs as follows:
   - Blades toothed and also shallowly wavy-lobed, the teeth of two sizes.
   - Leaves rounded to subcordate at the base.
   - Cones averaging somewhat larger, 12-20 mm. long.

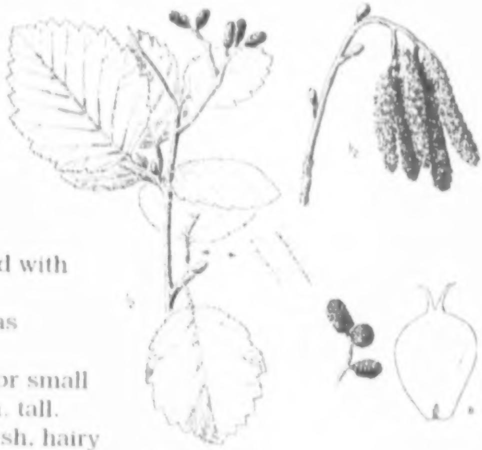
Similar Species:

1. ***Corylus cornuta*** Marsh - Beaked Hazelnut
   Frequent in the parkland and boreal forest regions, found in moist thickets, rich woodlands.
   Distinguished as follows:
   - Rhizomatous, bushy shrubs to 3 (4) m. tall.
   - Twigs reddish-brown, hairy, with glandular hairs.



- Blades 4-10 cm. long, ovate-obovate, the base often somewhat heart-shaped, the top short to long-pointed.
- Leaves dull green, hairless above, pale and hairy (at least on veins) below.
- Leaf margins sharply toothed/shallowly lobed.
- Staminate catkins drooping, the pistillate short, bud-like.
- Styles conspicuous, bright red-purple.
- Fruit a hard-shelled nut, contained within the bristly, long-beaked bracts.

2. ***Alnus tenuifolia*** Nutt. - River Alder



Frequent in all regions except the prairies. Found along streams, on lake shores, in rich river valleys where often associated with balsam poplar. Distinguished as follows:

- Tall shrub or small tree 2-10 m. tall.
- Twigs reddish, hairy at first, becoming smooth, grey.
- Winter buds stalked, blunt, the 2-3 scales nearly equal in length.
- Leaves 3-10 cm. long, oval-ovate, firm, round to somewhat heart-shaped at the base, the top blunt-pointed.
- Leaf margins wavy-lobed, toothed.
- Leaves dull green, often finely hairy above, paler and hairy at least on veins and vein axils below.
- Nutlets with thin margins but scarcely winged.

Habitat & Distribution: Common in the foothills, montane and boreal forest regions, also present in the parkland. Found in woodlands and thickets, in moist or boggy woods, along streams, in coniferous forests, sometimes in sandy woods. Frequently occurs with ferns in foothills and boreal sites where it is an indicator of moist, rich, diverse ecosites.

Forage Value: Poor to fair, the foliage and twigs thought to be nutritious, with a fairly high protein content; however, alder species rank among the less palatable browse species, used only sparingly by both livestock and game when more attractive browse is depleted, but leaves, young growth and even older bark readily eaten in severe weather when food supplies are scarce; this rather extensive utilization occurs primarily on elk and moose winter range in the upper foothills; alders provide important cover and habitat for wildlife, and are an important source of food for beaver.

Grazing Response: An increaser; plants are good competitors, reproducing readily by both rhizomes and seed, and are resistant to fairly heavy browsing.

Notes: *Alnus*, the Latin name for alder, and *crispa* a reference to the wavy leaf margins; alders were extensively used by native people, the inner bark and buds providing emergency food, and the aged bark used to treat constipation, jaundice and diarrhea, teas taken for T.B. of the lymph glands; inner bark poultices were applied to skin conditions, and root teas, high in tannin, taken for their astringent properties; leaf decoctions were used on burns and inflamation, and fresh leaves placed in moccasins to relieve tired feet; alder is also used in the production of dyes, colors varying from reds, golds, olive green to browns and blacks; *A. crispa* is generally too small for extensive commercial use, but larger trunks of *A. tenuifolia* can be cut for poles, and the wood of both species useful as fuel, sometimes used to smoke salmon; from an environmental standpoint, alders are important: they are valuable understory species, protecting soil along water courses, also pioneers on disturbed mineral soil; *A. crispa* establishes well, the plants with high moisture requirements but tolerant of acidic and infertile soils; *Alnus* species act as nurse trees, improving soil by adding organic matter and also capable of fixing nitrogen; as with poplar, however, the leaf fall tends to further acidify soils; alders can be successfully established from seed or transplanting seedlings, also by twig and root cuttings. *Note:* Hazelnut (*Corylus cornuta*) rates much the same in terms of browse value, and the nuts are an important source of food for Clark's nutcrackers, jays and squirrels; the species is useful in revegetating disturbances in central and northern regions.

BETULA L. - Birch

Common Characteristics

- Trees or shrubs with thin bark with evident elongated horizontal lenticels, and in some species bark peeling into layers.
- Buds axillary, with several scales, not stalked.
- Catkin bud scales white-bordered.
- Leaves alternate, mostly toothed, stipulate.
- Staminate catkins in groups of 1-4, elongate, drooping.
- Pistillate catkins with thin, membranous, 3-lobed bracts.
- Fruit a winged samara surrounding a 1-seeded nutlet.
- Fruit and bracts early deciduous, leaving the persistent axis.

Key to Betula

1. Trees or tall shrubs at least 3 m. in height; leaves rather thin, mostly at least 3 cm. long, with petioles 1 cm. long or more; samara wings at least as wide as nutlet. **2**

Shrubs mostly to 2-3 m. tall; leaves firm, less than 3 cm. long, petioles less than 1 cm. long; samara wings narrower than nutlet. **3**

2. Small trees with dark, unpeeling bark; leaves rounded, not pointed, to 4 cm. long; lateral bracts angular, pointed, divergent in fruit. *B. occidentalis*

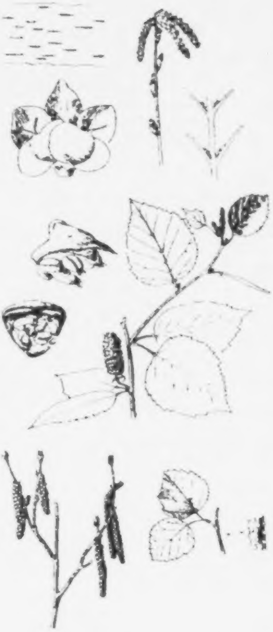
Trees with paler peeling bark; leaves 3-7 cm. long, pointed; lateral bracts obtuse. *B. papyrifera*

3. Shrubs to 2 m. tall; twigs not obviously hairy but glandular; catkin scales with resinous dots; leaves 1-2 cm. long, circular, margins with less than 10 teeth per side (in unhybridized forms); blades leathery; wings of fruit less than ½ as wide as nutlets. *B. glandulosa*

Shrubs to 3 m. tall; twigs hairy, with some yellow-white glands; blades circular-obovate, 1.5-4 cm. long, the margins with 14-20 teeth; wings on fruit about ½ as wide as nutlets. *B. pumila*

Note: *Betula* species frequently hybridize, resulting in offspring varying in characteristics somewhere between the parent species. Although some rather consistent, well defined hybrids do occur, many are unstable and plastic, and all are difficult to identify. Because of this they will not be included in this text.

Betula papyrifera Marsh. var. ***papyrifera*** - White or Paper Birch



Growth Habit: **Trees, from 10-25 m. tall**, often with several main trunks, these to 6.5 dm. across; crowns with ascending branches, narrowly oval in outline; bark **mostly white, thin, readily peeling into sheets, lenticels dark, conspicuous**; twigs **with long hairs, not glandular**, reddish-brown; buds conic, pointed, with 3 overlapping slightly resinous, hair-fringed brown scales, the tips usually darker.

Blades: Leaves **ovate, 5-7 cm. long**, the **tips long-pointed**, the bases rounded-subcordate, coarsely and mostly doubly toothed, dull, usually paler beneath and **with tufts of hairs in vein axils**.

Inflorescence: Staminate and pistillate flowers on same twig, the staminate in narrow catkins; pistillate catkins in pairs, cylindric, drooping, 2.5-5 cm. long; bracts **membranous, 3-lobed**, with blunt ascending lobes, hair-fringed and often hairy across the back; fruit a broadly **winged samara**, these 3 per bract, the nutlets finely hairy, **broadly oval**.

Similar Species:

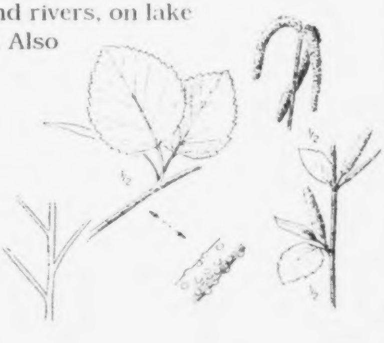
1. ***Betula occidentalis*** Hook. var. ***occidentalis*** - Water Birch

   Found in all ecoregions, less common in the boreal forest.

   Grows along streams and rivers, on lake shores, in moist woods. Also found in sandy grassland with an elevated water table.

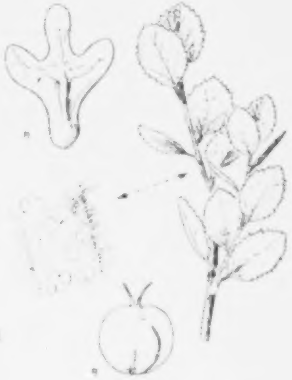
   Differs as follows:

   - Smaller trees, to 10 m. tall.
   - Bark dark red-brown, not readily peeling.



- Twigs hairy and with reddish glands.
- Leaves circular to oval-obovate, the tips mostly rounded, 2.5-5 cm. long.
- Bract lobes distinctly angular, pointed, pointing outward.

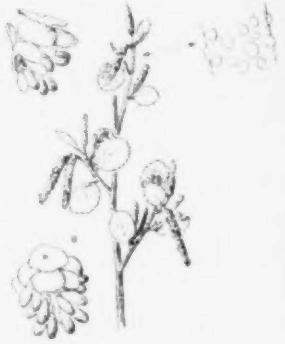
2. ***Betula pumila*** L. var. ***glandulifera*** Regel - Dwarf Birch



Common in the boreal forest, also found in the foothills, montane and parkland regions. Grows in swampy woods, in marshes, in both nutrient-poor bogs and more productive fertile fens. Distinguished as follows:

- Bushy shrubs to 3 m. tall.
- Bark dark brown, not peeling.
- Twigs red-brown, hairy, with some yellow-white glands.
- Blades circular-obovate, 1.5-4 cm. long.
- Leaf margins with about 14-20 teeth.
- Leaves firm, paler and glandular-dotted below.
- Pistillate catkins 1-3 cm. long.
- Wings on fruit about ½ as wide as the nutlets.

3. ***Betula glandulosa*** Michx. - Bog or Dwarf Birch; Scrub Birch



Found primarily in the foothills, montane and boreal forest regions. Grows along streams, in muskegs and bogs, on moist to somewhat dry sites at alpine elevations. Differs from *B. pumila:*

- Shrubs smaller (to 2 m. tall).
- Twigs inconspicuously hairy but densely glandular.
- Catkin scales with resinous dots.
- Leaves smaller (1-2 cm. long), more circular.
- Leaf margins with less than 10 teeth per side.
- Blades leathery, glossy above.
- Pistillate catkins to 1.5 cm. long.
- Wings on fruit narrower, less than ½ as wide as the nutlets.

Habitat & Distribution:	Common in the boreal forest, foothills and montane regions, also occasional in the parkland region. Grows on moist upland sites where associated with aspen and white spruce, and in bogs, on shores, in other poorly drained areas.
Forage Value:	Fair, birch species with nutritional quality similar to that of alders, and palatability generally moderate, utilization varying from one region to the next, usually dependent upon availability of choice species; birches can be an important food supply throughout the year for game, used by livestock primarily in the winter and spring.
Grazing Response:	Increasers, tolerant of moderate to heavy browsing, and readily suckering to produce new plants; *B. glandulosa* is an especially competitive species, forming extensive stands in western and northern rangelands.
Notes:	*Betula*, the name used by Pliny, means pitch, the specific and common names a reference to the peeling papery bark; paper birch has been variously used, the inner red bark, rich in vitamins and minerals, added to soups and stews; most birches produce sap that can be made into syrup with a flavor similar to that of maple syrup, and young leaves and catkins can be used as flavoring in meats and vegetables; birch sap was used by pioneers as a tonic, and gargled for cankers and sore throats, also used for various skin problems; birches contain populin, which has aspirin-like properties, and was used for a variety of ailments; birch leaves are known to be effective diuretics and were used in the treatment of kidney problems; the bark was used as paper and for making various small articles and by northern Indians in the construction of canoes, and the heavy, hard wood was especially valued as a source of fuel; commercially, birches are used for pulpwood, veneers, plywood, and small items such as crates, spools, and toys; paper birch has considerable ornamental value, also useful in reclamation work, the genus as whole with deep root systems capable of readily stabilizing disturbed soil, also enabling them to withstand moderate drought, and most (especially *B. glandulosa*) are at least somewhat acid tolerant; they are recommended as early successional species, and can be propagated by stem cuttings and seed.

CHENOPODIACEAE - Goosefoot Family

Common Characteristics

- Annuals, perennials, or shrubs.
- Leaves alternate, without stipules or pale bracts.
- Leaves often fleshy and/or white-mealy.
- Flowers small, few in leaf axils, or in terminal clusters, perfect or imperfect.
- Corolla absent, calyx greenish, of 5 or less united sepals.
- Stamens usually as many as perianth segments and opposite them (sometimes less).
- Ovary superior.
- Fruit with a thin wall (pericarp), 1-seeded, small, either enclosed by the calyx or by a pair of small bracts in some species.

Key to Chenopodiaceae

1. Spiny shrubs, 1-2 m. tall; leaves narrow, fleshy; flowers imperfect, the staminate in catkin-like spikes. *Sarcobatus*

Plants less than 1 m. tall; leaves not fleshy. **2**

2. Plants densely hairy with star-shaped hairs; blades narrow; inflorescence woolly hair. *Eurotia*

Plants not hairy, but grey-green scruffy; blades broader (narrowly oblanceolate-oblong). *Atriplex*

ATRIPLEX L. - Orache; Saltbush

Common Characteristics

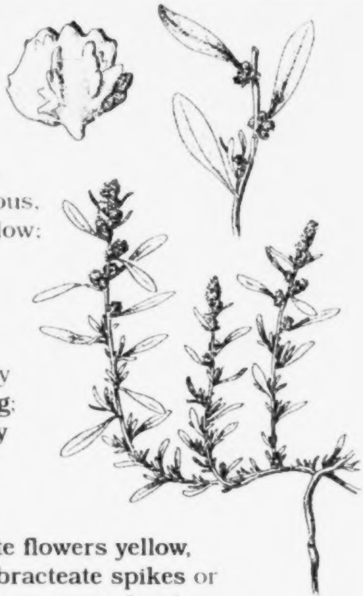
- Herbs or low shrubs.
- Foliage usually scruffy-mealy, often silvery.
- Blades alternate (or lowest opposite).
- Plants monoecious or dioecious.
- Flowers in dense axillary clusters or in compound spikes.
- Staminate flowers with a 3-5 lobed calyx and 3-5 stamens.
- Pistillate flowers without sepals (usually), but with a pair of bracteoles.
- Bracteoles uniting and enlarging in fruit, often hardened & with tubercles on the surface.

Key to Atriplex

1. Plants mostly woody at base; bracteoles rounded, without wings but with small tubercles. *A. nuttallii*

Plants often woody throughout; bracteoles irregularly shaped, with 4 wavy-toothed wings. *A. canescens*

Atriplex nuttallii S. Wats. - Nuttall's Atriplex: Salt Sage



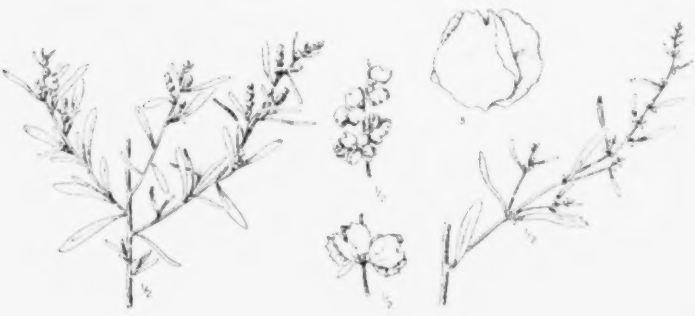
Growth Habit: Perennial **shrubs, woody at least at the base**, from deep taproots; plants usually **much branched**, spreading to ascending, **1-5 (6) dm. tall**; lower stems woody, upper stems herbaceous, **grey-scruffy**, often peeling below; winter buds naked, not conspicuous.

Blades: Leaves alternate, linear-oblong or oblanceolate, nearly stalkless, **entire, 1-5 cm. long**; blades **grey-green and scruffy on both sides**.

Inflorescence: Male and female flowers on separate plants, the **staminate flowers yellow, in glomerate, terminal leafy-bracteate spikes** or panicles; perianth present (staminate), deeply lobed; pistillate flowers in axillary and terminal spikes or panicles; bracteoles **4-7 mm. long, the margins toothed, not winged**, the surface **with small projections**; seeds round, slightly spiny.

Similar Species:

1. ***Atriplex canescens*** (Pursh) Nutt. var. ***aperta*** (A. Nels.) C.L. Hitchc. - Saltbush
   Uncommon in northern regions, common and widespread in the southern prairies. Grows on open saline flats.



Distinguished as follows:

- Plants usually woody throughout.
- Pistillate flowers with bracteoles irregular in shape, with 4 prominent lateral wings, these wavy-toothed.
- Bracteoles without tubercles.

Habitat & Distribution: Common in the prairie and parkland regions. Found on dry alluvial flats, on eroded slopes and in badlands, common on saline and alkaline soils, often growing on alkali clays, on depressional saline sites.

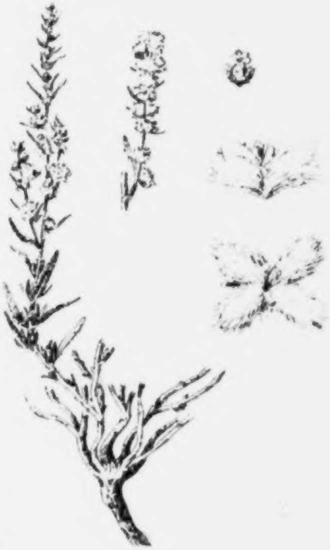
Forage Value: Good, protein content remaining as high as 10% in late fall, and phosphorus content about twice that of cured grasses and that of ash high; crude fiber levels remain low throughout the season; *A. nuttallii* is palatable to all classes of livestock and game, eaten readily throughout the season but particularly during fall and winter; Nuttall's atriplex is supposedly mildly toxic, the plants grow on highly alkaline or saline and also on selenium bearing soils where the species is a secondary selenium absorber; under normal conditions, however, it is consumed in large quantities without ill effect.

Grazing Response: A decreaser, the species totally reliant upon seed for reproduction, and often heavily utilized to the extent that little seed matures; the deep woody taproot does give a moderate tolerance to grazing and trampling as well as droughty conditions.

Notes: The generic name originates from *ater*, black and *plecto*, to braid, this possibly describing the dark, congested flower clusters; *A. nuttallii* was apparently little used by native people except perhaps to pasture horses; the related herbaceous species were sometimes eaten, either raw or cooked, and are high in vitamins and minerals; *A. nuttallii* rates very highly as a reclamation species, tolerance of saline, alkaline, and poor, infertile soils is high, and once established plants are hardy and grow well under very dry conditions; the species can be successfully propagated from seed, but as yet local supplies of seed are scarce.

EUROTIA Adans. - Winter Fat; White Sage

Eurotia lanata (Pursh) Moq. - Winter Fat



Growth Habit: Rather low growing perennials, from stout woody roots, **woody and branching at the base**, the bark grey, producing several erect annual stems, **1.5-5 dm. tall**; stems **densely white-rusty hairy with star-shaped hairs**; woody bases grey-brown, somewhat furrowed.

Blades: Leaves **alternate, linear**, nearly stalkless, **to 4 cm. long**, the **margins rolled;** blades rather numerous, usually with secondary fascicles in their axils; leaves **grey-green to rusty-green from dense white-rusty star-shaped hairs** (mixed with longer hairs).

Inflorescence: Plants monoecious, the **staminate flowers in upper axils**, without bracteoles, with a 4-lobed calyx and 4 exserted stamens; pistillate flowers **below staminate**, 2-4 in each axil, each with 2 bracteoles, these densely long-hairy, united into a tube that encloses the fruit; bracteoles 4-6 mm. long at maturity, with 2 horn-like tips; seeds obovate.

Habitat & Distribution: Common in the prairies, occasional in foothills and parkland regions. Found in dry prairie grassland, on dry slopes, on dry saline flats, on heavy, often alkali clay soils.

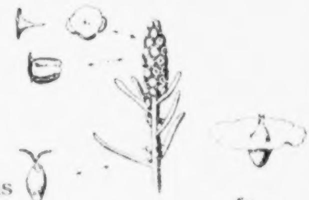
Forage Value: Good, nutrients in good balance, and protein and phosphorus levels especially good and remaining higher than average into fall and winter when winter fat is an especially important food source, valued as a component of antelope winter range; all parts of the plant are palatable to both livestock and game, the species known to many as an "ice cream" plant.

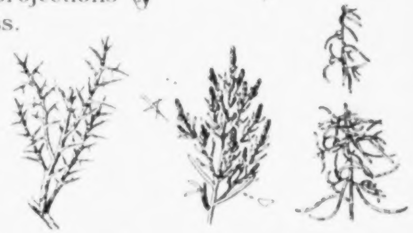
Grazing Response:	A decreaser; the deep penetrating taproots give plants good resistance to trampling and drought but unless rangelands are maintained in good condition and rested periodically to allow for adequate seed set, winter fat will show progressively poorer vigor and stands will decline.
Notes:	Both generic and specific names refer to the densely woolly foliage, winter fat an appropriate name, describing the exceptional quality of the species in the winter; unlike other species in the goosefoot family, *E. lanata* was used rather sparingly by native people, young shoots were sometimes made into tea, and a solution using leaves was used to wash hair; winter fat has been used to some extent for ornamental purposes, valued primarily for its drought tolerance, and is also highly recommended in revegetating native sites in the prairie region, especially on poor, often alkaline or saline soils where the natural vegetation cover is predominantly of low quality as far as forage value is concerned.

SARCOBATUS Nees - Greasewood

Sarcobatus vermiculatus (Hook.) Torr. - Greasewood

Growth Habit: Erect, monoecious **shrubs to 3 m. tall; stems widely branching, pale yellowish-white**, often finely hairy when young; older bark yellowish-grey; **lower branches spine-tipped**, new growth roughened from projections at leaf bases but spineless.





Blades: Plants deciduous, the leaves **alternate, linear and rounded, fleshy, 1.5-4 cm. long, pale yellow-green**.

Inflorescence: Flowers borne in numerous terminal and axillary spikes, the **staminate uppermost on the plant, in dense catkin-like spikes**; each staminate flower without perianth, with 3 stamens borne under a long-stalked, pale 4-sided scale; pistillate flowers **1-2 per axil**, each flower with a cup-shaped, shallowly wavy-lobed calyx; perianth enlarged in fruit, the upper portion widely flaring and forming a membranous wing; fruit an achene 4-5 mm. long.

Habitat & Distribution: Common in the prairies, occasional in the parkland region. Grows in saline and alkaline soils: around sloughs and on saline/alkaline flats, often in heavy clays, on eroded slopes.

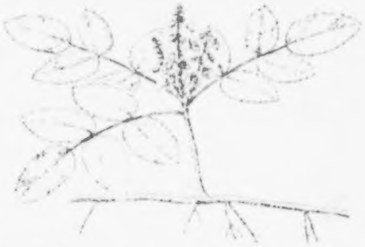
Forage Value: Fair, providing moderately nutritious and palatable forage in areas where other vegetation cover is sparse; greasewood, however, is toxic due to a soluble oxalate salt content, the greatest concentration in the leaves and this increasing as plants mature; when grazed early, and when other nutritious vegetation is abundant, incidents of poisoning will be reduced significantly.

Grazing Response: An increaser, and sometimes the dominant or exclusive vegetation on alkaline flats.

Notes: Only a few species in the genus, these in drier parts of western N. America; from the Greek *sarko*, flesh, and *batos*, bramble, alluding to the succulent leaves and spiny branches.

BERBERIDACEAE - Barberry Family

Berberis repens Lindl. - Creeping Mahonia



Growth Habit: **Low shrubs, stems trailing and rooting, to 3 dm. long.**

Blades: **Leaves pinnate, with 3-7 thick, leathery leaflets**, these ovate-oblong, **with prominent spiny teeth along margins**; leaves glossy to dull above, dull and glaucous below and minutely papillose; **leaves persisting into fall**, red-purple-tinged.

Inflorescence: Flowers several in racemes; sepals 6, **yellow**, petals 6, in 2 series, each with 2 basal glands; stamens 6, closing around the pistil when stimulated by touch; **fruit a juicy blue-glaucous berry with several large seeds**.

Habitat & Distribution: Locally abundant in the southern Rocky Mountains. Grows in shaded mountain forests, a common understory species in some mesic coniferous-dominated sites.

Forage Value: Poor, members of the family little grazed by livestock, utilization by game also minimal and restricted to late in the season following defoliation or depletion of palatable species.

Grazing Response: An increaser.

Notes: Syn. *Mahonia repens*; also known as Oregon grape; traditionally aboriginal uses of the species were numerous, tonics taken for various ailments of the digestive system, and the alkaloid berberine obtained from the root bark, this with broad spectrum antifungal and antibacterial properties, used to treat liver disorders and dilate blood vessels, with the supposed ability to lower blood pressure; the bright yellow wood was used by some tribes to make a yellow dye, and a juice made from berries given to horses to cure coughs; modern uses are also considerable, listed as a tonic, laxative, stimulant and antiseptic, and the fruit prized for making jellies, wine and pies; various related species have been extensively cultivated as ornamentals for use in shaded gardens, also for their foliage, used in crafts and to make Christmas decorations.

GROSSULARIACEAE - Currant/Gooseberry Family

RIBES L. - Currant; Gooseberry

Common Characteristics

- Spreading to erect shrubs, often glandular, the stems and branches often bristly and with nodal spines.
- Pith with sponge-like cavities.
- Twigs usually angled, often shredding.
- Blades alternate, 3-5 (7) lobed, palmately veined.
- Flowers solitary or in racemes, mostly regular.
- Stalks often jointed below ovaries (currants only), and often with a small bract at or below the middle.
- Calyx 5-lobed, petals 5, separate.
- Stamens 5, alternate the petals.
- Ovary inferior.
- Fruit a berry, this sometimes hairy or glandular.

Key to Ribes

1. Stems with at least some prickles and bristles; flowers mostly 2-5. 2

Stems without prickles and bristles; flowers few to numerous. 3

2. Calyx open-saucer-shaped; pedicels with evident joints below ovary; fruit a bristly black currant. *R. lacustre*

Calyx more closed-cup-shaped; pedicels not jointed below ovary; fruit a smooth gooseberry. *R. oxyacanthoides*

3. Flowers somewhat irregular, yellow to reddish; prairie species. *R. aureum*

Flowers regular, not yellow. 4

4. Leaves lacking glands; fruit red to blackish. 5

Leaves with glands or stalked glands; fruit black. 6

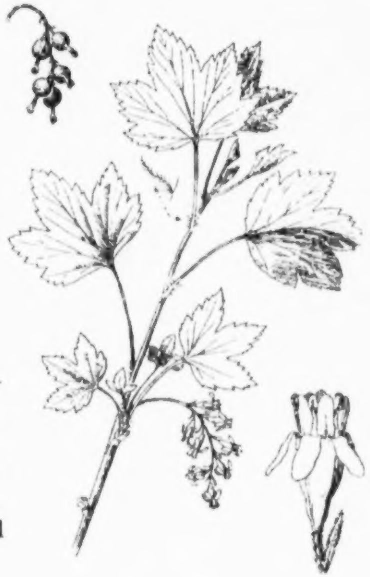
5. Ovary and fruit with bristly hairs. *R. glandulosum*

Ovary and fruit not bristly; pedicels somewhat glandular. *R. triste*

6. Hypanthium narrow (tubular); sepals greenish-yellowish; fruit without glands; leaves sometimes finely hairy below. *R. americanum*

Hypanthium broad (cup-shaped); sepals white; fruit with a few stalkless glands; leaves more persistently finely hairy below. *R. hudsonianum*

Ribes americanum Mill. - Wild Black Currant



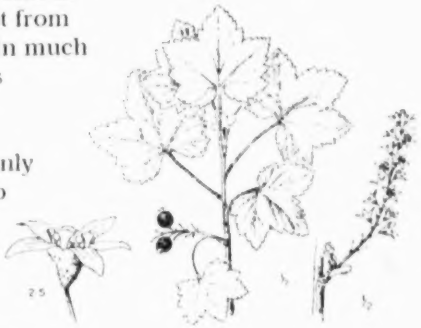
Growth Habit: Shrubs to 1 m. tall, **without spines**; branches mostly erect, finely hairy, grey, **with stalkless yellowish glands**; bark becoming dark grey and hairless; winter buds stalkless, rounded, outer scales tan, the inner reddish, **with glands**.

Blades: Leaves 2-7 cm. broad, **circular** and **with three primary** (and often 2 smaller basal) **lobes, these sharply toothed**; stalks finely hairy and with a few long hair-like projections; blades **hairless above, hairy on margins and veins below, also yellow glandular-dotted below**.

Inflorescence: Racemes with several-numerous flowers, **drooping**, the stalks jointed, often exceeded by the narrow bracts; ovary (and fruit) **mostly hairless, lacking glands**; sepals hairy, **greenish or yellowish-white**, 4-5 mm. long, the lobes reflexed; flowers cylindrical-narrowly cup-shaped; petals about equalling stamens, 2.5-3 mm. long; berries **black**, to 6-8 mm. wide, **smooth**.

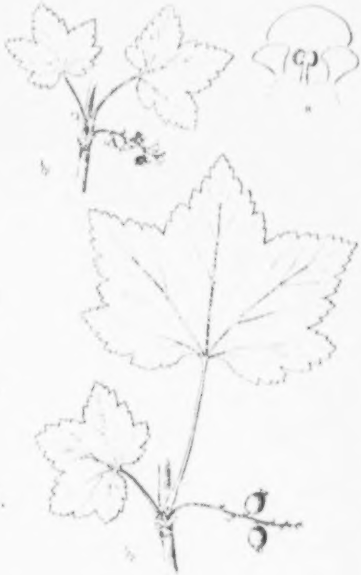
Similar Species:

1. ***Ribes hudsonianum*** Richards. - Wild Black Currant
   More widespread, found in most regions. Absent from the prairies. Found in much the same habitats as *R. americanum*.
   Differs as follows:
   - Blades more evenly hairy below (also glandular dotted).



- Racemes ascending.
- Bracts (subtending flower stalks) shorter than stalks.
- Flowers broadly cup-shaped.
- Ovary (and fruit) with a few yellowish, stalkless glands.

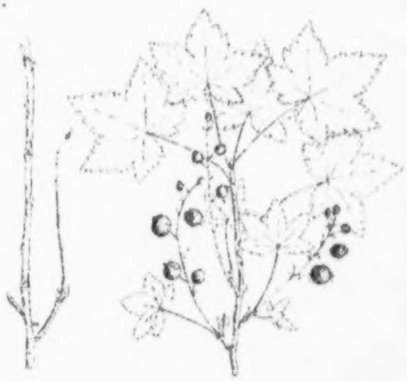
2. ***Ribes triste*** Pall. - Wild Red Currant



Occasional in foothills and parkland regions, common throughout the boreal forest. Grows in moist woods, along wooded streams, in shaded boggy and swampy places. Distinguished as follows:

- Spineless shrubs to 1 m. tall, often reclining and rooting.
- Young stems with a few stalked glands, older stems shredding, red-brown.
- Leaves round in outline, often somewhat heart-shaped at the base, to 8 cm. broad.
- Blades with 3 main (+2 small) broadly triangular lobes, again toothed.
- Leaves without glands, often somewhat hairy below.
- Flowers and fruit smooth.
- Flowers red-purplish.
- Berries bright red.

3. ***Ribes glandulosum*** Grauer - Skunk Currant



Common in the boreal and parkland regions, occasional in foothills and montane areas to the west. Found in moist woods and clearings.

Distinguished as follows:

- Leaves rounded, 5-7 lobed, the lobes ovate, acute, toothed, the bases cordate.
- Blades glabrous or sparsely hairy on veins below.
- Racemes ascending, glandular hairy.
- Sepals 2-2.5 mm. long, glabrous.
- Petals to 1.5 mm. long, white to reddish.
- Fruit dark red, glandular-bristly.

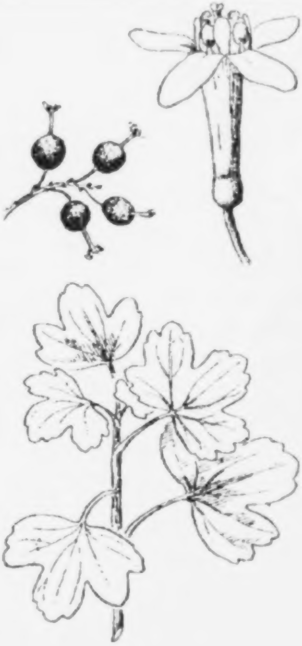
Habitat & Distribution: Common but restricted to the parkland and southern boreal forest regions. Grows in moist thickets and woodlands, on wooded shorelines.

Forage Value: Poor, both red and black currants seldom utilized when forage is plentiful, but are browsed to some extent during winter months, more frequently so in coniferous forests where there is often a shortage of palatable browse; currants do produce relatively large amounts of forage, and are usually conducive to browsing because of their low, bushy growth form; berries of all species are an important source of food for birds and smaller animals.

Grazing Response: Increasers (both red and black currant species) but usually not particularly abundant because of restricted habitat requirements.

Notes: Currants are prized for jam and jelly making, also have variety of medicinal uses: stems, bark and roots of black currants were used by the Cree, sometimes *R. hudsonianum* and *glandulosum* used in combination to aid conception; black currant juice can ease throat inflamation, also used as a diuretic and in feverish conditions, and root decoctions are useful for calculi, in cases of dropsy, and to expel worms; red currant jelly has an antiseptic effect, mixtures also used to treat burns and prevent blistering; black currant seeds contain significant quantities of omega-3 and omega-6 essential fatty acids which are effective in treating asthma, arthritis, skin problems and PMS; both red and black currants can be recommended as native shrubs in revegetation projects, all requiring good moisture conditions, and tolerant of at least moderate soil acidity; *Ribes* species are successfully propagated by both seed and wood cuttings, also by layering.

Ribes aureum Pursh - Golden Currant



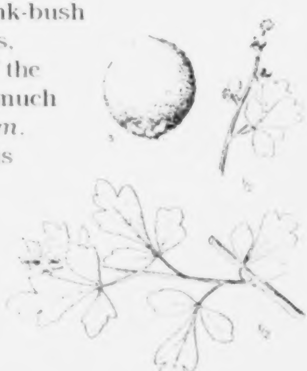
Growth Habit: Erect shrub **1-2 m. tall, without spines**; branches reddish, sometimes finely hairy when young, becoming grey/dark grey and hairless.

Blades: Leaves **triangular-ovate in outline**, 2-5 cm. broad, **with 3 main lobes**, these toothed **and the basal 2 sometimes again shallowly lobed**; leaves firm and thick at maturity, **essentially hairless, sometimes with a few remote stalkless glands.**

Inflorescence: Flowers in ascending to erect racemes; stalks to 8 mm. long, jointed under the ovary, often surpassed by the bracts; calyx **hairless, golden yellow**, cylindrical, 6-10 mm. long, the lobes 4-6 mm. long, spreading but not reflexed; petals **somewhat irregular, yellow, orange-red tipped**, about equalling stamens; berries **hairless, globose, yellow-red to blackish**.

Other Species:

1. ***Rhus trilobata*** Nutt. - Skunk-bush
   Found primarily in the prairies, occasional in drier portions of the the foothills region. Grows in much the same habitats as *R. aureum*. The foliage of the two species is similar, although significant differences between the families occur (*Anacardiaceae*). The non-woody, low growing *Rhus radicans* L. - poison ivy - grows in shrubby areas, coulees in all but boreal regions; leaflets are ovate, often toothed, in 3's, 4-15 cm. long; fruit is glabrous, whitish.



Distinguished as follows:

- Male and female flowers on separate plants.
- Staminate winter buds conspicuous, catkin-like, the pistillate hidden behind leaf bases.
- Leaves without glands but bristly-hairy below.
- Ovary superior.
- Fruit red, 1-seeded, the surface warty-hairy.

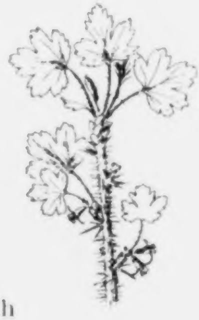
Habitat & Distribution: Common in the prairies, occasional in the southern parkland region. Found on slopes along rivers, on coulee slopes and drainage areas, in shrubby thickets.

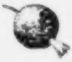
Forage Value: Poor, the genus rated as low to moderately palatable, primarily browsed by game in the winter months in the absence of other forage; utilization of *R. aureum* is probably higher, as it inhabits areas where browse plants tend to be less abundant. *Note: Rhus trilobata* is rated much the same, but also often browsed to a moderate extent due to a general shortage of feed.

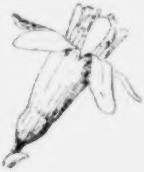
Grazing Response: Increasers (both species), but seldom forming dense stands, this at least partially because of restricted habitat requirements.

Notes: *Ribes*, Arabic in origin, from *ribas*, a medical name for an unrelated species, *Rheum ribes; aureum*, alluding to the yellow flowers; the native golden currant is closely related to *R. odoratum*, cultivated for its fruit; native people used currants fresh (apparently seldom drying or preserving them), also used root extracts to treat kidney and uterine problems; raw currants have a cleansing effect on the digestive system, and apparently remove toxins from the body, although use of excessive quantities will cause stomach trouble; both *R. aureum* and *Rhus trilobata* have considerable ornamental potential, also are useful in stabilizing erodable slopes in the prairie region.

Ribes oxyacanthoides L. - Wild Gooseberry







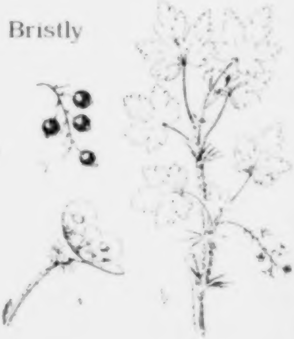
Growth Habit: **Spiny shrubs to 1 m. tall**, the plants bushy and spreading to erect; branches and stems **with large, stout nodal spines and smaller, internodal spines**; young twigs yellowish and finely hairy, becoming grey and hairless; winter buds with sharp pointed scales.

Blades: Leaves broadly ovate in outline, **often heart-shaped** at the base, to 4 cm. broad, **3-5 lobed about ½ way to midrib and again toothed**; leaves dark green above and paler beneath, **hairy and also glandular, more densely so below**; stalks rather densely finely hairy and stipitate glandular.

Inflorescence: Racemes short and few (1-3) flowered, the flower stalks finely hairy and sometimes with a few stipitate glands, **not jointed below the ovary**, the bracts glandular-hairy; calyx hairless, tube bell-shaped, 3 mm. long, **greenish-white; calyx lobes greenish-yellow**, spreading-reflexed; petals **relatively long, about equalling the stamens**; berries green with paler nerves when immature, **turning dark bluish-purple, hairless**.

Similar Species:

1. *Ribes lacustre* (Pers.) Poir. - Bristly Black Currant
   Common in the foothills, montane and boreal forest regions. Found in moist woods, along streams, in swampy places. Also grows in somewhat drier habitats at alpine elevations.
   Differs as follows:
   - Leaves hairless above, finely hairy below but not glandular.



- Foliage with a strong "skunk-like" odor.
- Flower stalks with a joint below the fruit (ovary).
- Calyx cup-shaped, with a pink disc.
- Petals pink.
- Berries dark purple-black, bristly with purplish glandular hairs.

Habitat & Distribution: Common throughout most regions. Grows in moist, rich and swampy woods, in thickets, on moist, sometimes rocky wooded slopes.

Forage Value: Poor, similar to that of other members of the genus; *Ribes oxyacanthoides* is by far the most abundant *Ribes* species, and as such often does provide considerable amounts of emergency browse.

Grazing Response: An increaser, the most successful competitor in the genus, this due, at least in part, to a wider range of adaptations.

Notes: Gooseberry juice is reputed to be a cure-all for inflammations, apparently more effective than rhubarb as a spring tonic, and the sub-acid content of the berries useful in counteracting the effects of rancid food; there is also some evidence that the green berries can slow the aging process and prevent related illnesses by slowing the degeneration of body cells; gooseberries, as with other *Ribes* species, are useful in revegetating disturbances; *Ribes oxyacanthoides* is of special interest as it is adapted to wide extremes in soil and moisture conditions (although use should be restricted to moist sites in the prairie region), and is particularly well suited to steep, erodable slopes.

ROSACEAE - Rose Family

Common Characteristics

- Herbaceous (annuals to perennials) or woody plants.
- Blades stipulate, alternate, simple to compound.
- Flowers perfect, regular, solitary or in cymes or racemes.
- Calyx 5-lobed, often alternating with 5 bracteoles.
- Petals 5, separate.
- Stamens usually numerous.
- Ovaries inferior or superior.
- Fruit variable: of achenes, follicles, or fleshy (pomes, drupes, drupelets).

Key to Woody Rosaceae

1.	Ovary(ies) superior.	2
	Ovary(ies) inferior.	8
2.	Leaves simple; carpel 1; fruit cherry-like.	*Prunus*
	Carpels at least 2.	3
3.	Leaves compound.	4
	Leaves simple.	6
4.	Flowers yellow, with 5 small bracts as well as sepals; fruit a dry achene.	*Potentilla*
	Small bracts absent; fruit fleshy.	5
5.	Fruit of achenes enclosed in a fleshy receptacle (hip).	*Rosa*
	Fruit a fleshy raspberry, from numerous carpels.	*Rubus*
6.	Dwarf plants, flowers single, with 8 petals; styles plumose; mountain species.	*Dryas*
	Flowers several, petals mostly 5.	7
7.	Fruit a fleshy raspberry, from numerous carpels; leaves simple or compound.	*Rubus*
	Fruit dry, from 2-5 carpels; leaves simple, toothed.	*Spiraea*
8.	Leaves pinnately compound; flowers in broad, flat-topped clusters (corymbs).	*Sorbus*
	Leaves simple.	9

9. Stems not thorny; leaves entire to toothed. *Amelanchier*

Stems with stout, stiff thorns; leaves mostly toothed-lobed. *Crataegus*

Key to Crataegus

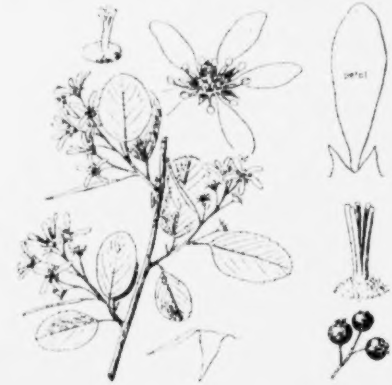
1. Thorns 2-7 cm. long; leaves with some hairs below; sepals glandular on margins, lanceolate; fruit red-purple. *C. rotundifolia*

2. Thorns less than 2 cm. long; leaves hairy above, mostly glabrous below; sepals not glandular but hairy above, ovate; fruit purplish-black. *C. douglasii*

AMELANCHIER Medic. - Service-berry; Saskatoon

Amelanchier alnifolia Nutt. - Saskatoon

Growth Habit: **Spineless shrubs or small trees, stoloniferous and colonial, 1-6 m. tall**; twigs reddish-brown, **finely hairy, becoming hairless, grey to dark red-brown**, furrowed to smooth; winter buds pointed, elongate, with several overlapping, finely hairy, reddish-brown/purplish scales.

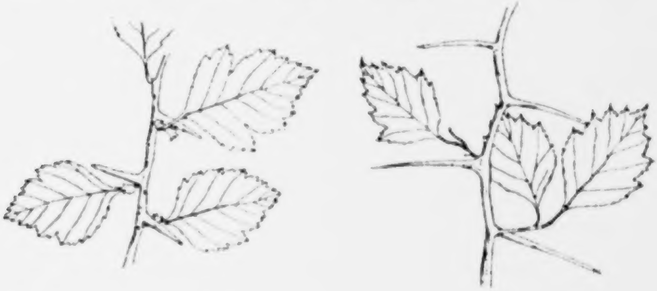


Blades: Leaves **alternate, oval-oblong or obovate, 2-5 cm. long, the top rounded to truncate, the base wedge-shaped to heart-shaped, the margins toothed, sometimes only above the middle**; leaves hairless above, hairy to nearly hairless below.

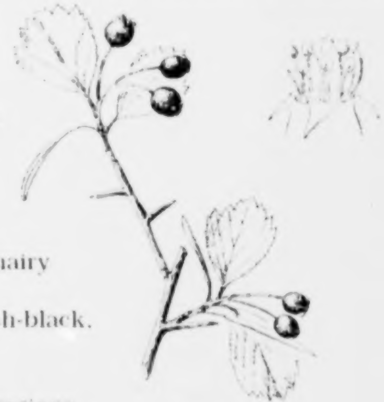
Inflorescence: Flowers 4-20 **in rather dense, erect racemes**; stalks ascending, 5-12 mm. long; calyx hairless to hairy, at least inside the tips of the 5 lobes, these long-pointed, spreading; petals 5, **white**, 10-20 mm. long; stamens (15) 20; ovary inferior; fruit **a berry-like pome, juicy**, 6-10 mm. across, **hairless, blue-purple and with a powdery covering**.

Other Species:

1. ***Crataegus rotundifolia*** Moench - Hawthorn; Round-leaved Hawthorn
   Frequent in the prairies, southern foothills/montane and parkland regions. Found in open woods and thickets, in ravines, on lush coulee slopes, along streams.



   Distinguished as follows:
   - Bushy shrub 1-5 m. tall.
   - Branches with stout thorns 2-7 cm. long.
   - Leaves broadly oval, rounded-pointed at both ends, 2.5-5 cm. long.
   - Leaf margins shallowly lobed and sharply toothed.
   - Flowers white, in corymbs, sepals triangular.
   - Fruit a reddish berry-like pome, rounded, with several bony nutlets, these not pitted.
2. ***Crataegus douglasii*** Lindl. - Hawthorn
   Common in the south, found in open thickets, on slopes. Differs from *C. rotundifolia* as follows:
   - Thorns stout but short, to 2 cm. long.
   - Leaves hairy above, glabrous below.
   - Sepals ovate/triangular, usually without glands but hairy above.
   - Fruit darker purplish-black, nutlets pitted.



Habitat & Distribution: Very common, found in all regions.
Grows in open woods, on borders of woodlands, in thickets, on shrubby coulee slopes and hillsides.

Forage Value: Good, nutrient levels high throughout the year, with some evidence that protein content is actually higher in the fall than summer, ranging between 7-13% during fall and winter; all portions of the plant are palatable to both game and livestock, heaviest utilization usually past mid-summer as grasses become depleted or dry; as well, the wide distribution, abundance and availability of saskatoon contribute to its worth as a range species; in early growth stages, plants contain prussic acid which is toxic, although actual occurrences of poisoning are rare; the fruit is an important source of food for birds, small mammals, and bears.

Grazing Response: A decreaser; saskatoon is resistant to moderate browsing, continuous clipping of outer twigs results in bushy, dense growth and this protects innermost foliage which then often is permitted to lengthen beyond browsing level; the colonial nature of the plants also increases reproductive options, but close and continuous utilization as is often the case on many rangelands will ultimately cause stands to decline.

Notes: *Amelanchier*, possibly from a French name for a European species, *alnifolia* a reference to the alder-like foliage; also known as June-berry; saskatoon berries were used extensively by native people for soups, stews, meat dishes, in pemmican, and dried or made into cakes for winter use; arrows and pipestems were constructed of shoots of either saskatoon or choke cherry; Blackfoot people drank saskatoon berry juice for stomach ailments and as a mild laxative, and eye and ear drops were made from immature or dried berries; green inner bark was used as an eye wash, and boiled cambium as a disinfectant; bark decoctions were taken to expel afterbirth, and root infusions to prevent miscarriages; hawthorn species are recognized globally as having the ability to treat irregular heart beat and high blood pressure; commerical use of saskatoon has increased in recent years, the trees now grown in orchards and the fruit made into preserves, pies, syrup, and wine; *A. alnifolia* is recommended in reclamation work, both as a valuable component of native range, and because it functions in stabilizing loose disturbed soils, especially useful on erodable slopes; it is adapted to a wide variety of soil and moisture regimes (but not suited to poorly drained areas or heavy clays) and can withstand moderate amounts of acidity and alkalinity; plants can be propagated by seed and also root or stem cuttings, and although somewhat slow to establish, show good growth and spread vegetatively by the second year.

DRYAS L. - Dryad; Mountain Avens

Common Characteristics

- Low, prostrate shrubs with nitrogen-fixing root nodules.
- Stems woody, horizontal, much-branched and freely rooting, forming large patches.
- Leaves simple, and often persisting, entire to crenate-serrate, alternate.
- Blades evergreen, leathery, green above with at least some tomentum below, usually revolute.
- Stipules present, linear-lanceolate.
- Flowers solitary on naked or weakly bracteate scapes.
- Flowers complete, perigynous.
- Hypanthium saucer-shaped, disc-lined within, glandular-pubescent outside.
- Sepals and petals each 8-10, petals white to pale yellow.
- Stamens and carpels numerous.
- Fruit an achene.
- Styles elongating and long-plumose and persistent in fruit, opening at maturity and ultimately air-borne.

Key to Dryas

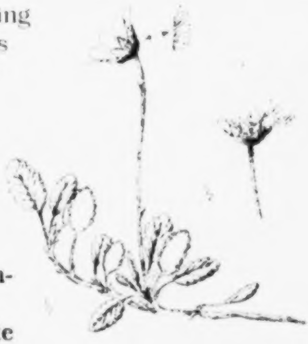
1. Leaves narrow-cuneate at the base; flowers yellow; filaments hairy. *D. drummondii*

Leaves broad to cordate at the base; flowers white; filaments glabrous. 2

2. Leaves entire or with a few basal teeth, smooth above, with the midvein below not conspicuous, not glandular. *D. integrifolia*

Leaves distinctly toothed, wrinkled above, the midvein below conspicuous, glandular. *D. octopetala*

Dryas drummondii Richards. - Yellow Dryad



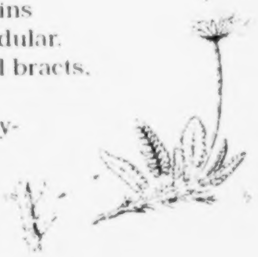
Growth Habit: Low, loosely caespitose, mat-forming shrub, the horizontal woody stems freely rooting; scapes persistently grey-tomentose, 5-25 cm. tall.

Blades: Leaves elliptic to oblong-obovate, 1.5-3 cm. long, **margins coarsely crenate and revolute, cuneate-based and rounded at the apex; leaves green-rugose above** (sometimes thinly tomentose) **and densely grey-white tomentose below; leaf stalks and lower leaf midvein sometimes with a few glandular hairs**.

Inflorescence: **Scapes usually with 1-4 small bracts**, the upper sometimes with an additional reduced flower; flowers mostly solitary; hypanthium and **calyx densely black glandular-hairy** as well as somewhat tomentose; **sepals and petals 8-10, sepals ovate; petals yellow**, ascending; **receptacle flattened; filaments pubescent toward base**; fruit an achene, the **plumose styles** yellowish.

Similar Species:

1. ***Dryas octopetala*** L. spp. ***hookeriana*** (Juz.) Hult. - White Dryad
   Frequent in the southern Rocky Mountains, more restricted to subalpine/alpine elevations. Grows on calcareous gravels, on alpine tundra and heaths, on disturbed rocky slopes.
   Differs as follows:
   - Blades similar but the bases truncate to subcordate.
   - Leaf stalks and lower midveins more consistently dark-glandular.
   - Scapes with 1 or no reduced bracts, glandular hairy.
   - Sepals linear-lanceolate, grey-tomentose and with some black glandular hairs.
   - Receptacle convex.
   - Petals white, spreading.
   - Filaments glabrous.

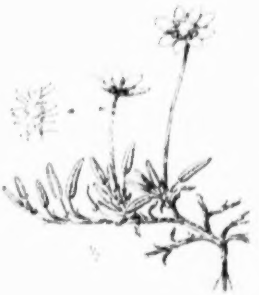


2. ***Dryas integrifolia*** M. Vahl - White Dryad

Also alpine, and found in similar habitats as *D. octopetala*. More restricted in its range, rare in southern regions.

Differs from it as follows:

- Leaves smaller (0.8-1.5 cm. long), entire or with a few teeth toward the base.
- Midrib below less prominent, eglandular.
- Upper leaf surface not rugose.



Habitat & Distribution: Common in the southern Rocky Mountain/foothills region. Grows on gravelly slopes and river banks, on talus slopes. A pioneer in disturbed areas, frequently seen along roads and trails, and where periodic flooding on fluvial flats creates occasional distubance.

Forage Value: Poor, ungrazed under normal conditions, also producing small quantities of herbage.

Grazing Response: Increasers on shallow, gravelly soils, but not competitive with lush vegetation typical of better sites.

Notes: *Dryas*, translating wood nymph, the specific name in honor of Thomas Drummond (1780-1835), a Scottish botanist who explored North America; *Dryas* species are prized ornamentals, best adapted to gravelly or rocky sites, the foliage, flowers and later the plumose seed heads all attractive; mountain avens, in particular *D. drummondii* as it has wider distribution patterns, grows in dense and sometimes exclusive colonies on gravelly river terraces; along with associated species such as loco-weeds and harebells, they form vegetation communities that are both spectacular and beneficial ground cover on shallow, stony soils.

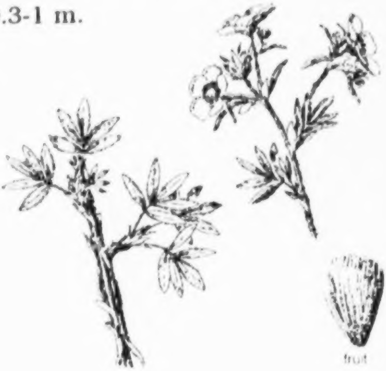
POTENTILLA L. - Cinquefoil

Common Characteristics

- Annual, biennial or perennial herbs (one species a shrub), often with well developed rhizomes.
- Leaves compound, alternate.
- Flowers (1) few-many in bracteate cymes.
- Bracteoles, sepals and petals each 5.
- Petals white, purplish, or more commonly yellowish.
- Fruit an achene.
- Styles not elongating, feathery or hooked in fruit; jointed near base and deciduous.

Potentilla fruticosa L. - Shrubby Cinquefoil

Growth Habit: A **much-branched shrub, 0.3-1 m. tall, forming branched rhizomes**; twigs yellowish or reddish-brown, silky-hairy, becoming hairless; older branches and stems **red-brown or grey, conspicuously shredded**; buds alternate, **hidden behind persistent leaf bases**, and the broad, papery stipules.



Blades: Leaves **mostly 5-pinnate, rather numerous, with reddish-brown membranous stipules**; leaflets **10-20 mm. long, linear to narrowly oval-oblong, entire, often rolled**, silky hairy above and below.

Inflorescence: Flowers solitary or 3-7 in cymes, axillary and terminal; calyx silky hairy, saucer-shaped, the sepals triangular to long-pointed, 4-6 mm. long; bracteoles present, **somewhat narrower**, also silky, about equalling sepals; petals **yellow**, spreading, exceeding calyx (8-13 mm. long); stamens 25-30; ovary superior; achenes egg-shaped, white-coarse-hairy.

Habitat & Distribution: Common in the foothills and montane regions, occasional elsewhere. Found in moist fescue grassland where often forming large colonies. Also on slopes and in open woods at higher elevations, and a component of acid bogs in the boreal region.

Forage Value: Poor; nutritional quality is relatively high and remains so into winter; protein levels average 12-15% at the end of July while fiber is low and phosphorus higher than that of associated grasses; palatability, however, is poor, primarily due to a bitter taste, and utilization is restricted to winter months when it is browsed to some extent by deer and elk or in cases where alternative forage is scarce; heavy use of the species is an indication of overstocking, and a depletion of choice forage.

Grazing Response: An increaser, invasive and persistent in native rangelands, as with other unpalatable species, maintaining vigor and maximum reproductive capacity while better quality species decline; shrubby cinquefoil can be troublesome even in good condition rangelands, and periodic mowing is often beneficial in controlling its expansion.

Notes: The specific name means bushy or shrubby; also called buckbrush, yellow rose; *P. fruticosa* was known to native people as a cure for a number of ailments, the leaves used for weak bowels and bleeding, and teas taken for stomach problems and esophagus inflammation, and poured over horses to prevent saddle sores; the dry, flaky bark was a good source of tinder, and in Europe the branches were used in broom-making; shrubby cinquefoil is widely cultivated as an ornamental, with a variety of flower colors currently available; a highly competitive species, *P. fruticosa* naturally moves onto depleted and exposed areas by both seed and vegetative means, and as such has been recognized to have some value in providing cover and in erosion control; it grows well on a wide variety of soils, tolerant of calcareous and relatively high acidic conditions, often naturally occurring in acid bogs in the north; however, in fescue grasslands, less aggressive, more palatable alternatives should be seeded in order to avoid the negative, long-term impact shrubby cinquefoil has on open rangelands.

PRUNUS L. - Plum; Cherry

Common Characteristics

- Shrubs or small trees with dark bark.
- Plants deciduous, the leaves alternate, simple, toothed and often with glands on leaf margins or on stalks.
- Flowers in racemes or umbels.
- Sepals and petals each 5, petals white.
- Ovary superior, becoming a 1-seeded drupe, this fleshy, the inner seed wall hardened, stony.

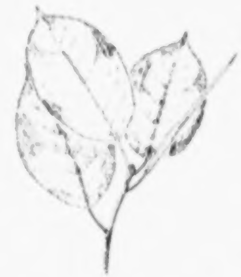
Key to Prunus

1. Flowers in umbel-like arrangements; leaves lanceolate, long-pointed, with irregular, rounded teeth; petioles glandular upward. *P. pensylvanica*

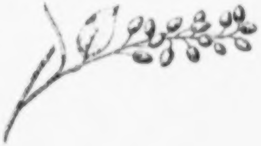
Flowers in elongate racemes; leaves elliptic-obovate, abruptly short-pointed, with sharp teeth; petioles not glandular. *P. virginiana*

Prunus virginiana L. - Choke Cherry

Growth Habit: Shrubs or small trees, up to 10 m. tall; branches slender, dark reddish-brown to grey, hairless; **older stems dark grey-brown to blackish**; buds **large**, pointed, with overlapping scales, the **upper portion light brown**, the **lower part darker brown**.



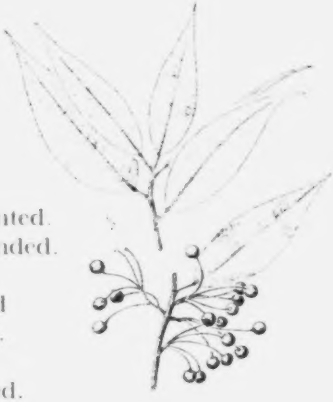
Blades: Leaves **5-10 cm. long, oval-obovate and with abruptly pointed or sometimes blunt tips**, leaves firm, hairless above, often sparsely hairy below, the margins with **rather uniform sharp teeth**, often with **purple tips**; stalks **not glandular or with a few purple glands above at junction with blade**.



Inflorescence: Flowers **in narrow elongate racemes** at the ends of new twigs, appearing after leaf expansion; racemes **with numerous white flowers**, to 15 cm. long; calyx hairless, gland-lined, the lobes oval, spreading, **glandular-jagged on margins**, petals about 4 mm. long; fruit **dark purple-black at maturity**, 8-10 mm. across, **astringent**.

Similar Species:

1. ***Prunus pensylvanica*** L.f. - Pin Cherry
   Frequent throughout most regions. Grows in open woods and clearings, in ravines, on coulee slopes, on burned-over areas, in sandy soil. Differs as follows:
   - Leaves narrower, lanceolate, and long-pointed.
   - Leaf teeth irregular, rounded.
   - Reddish-yellow glands present on leaf teeth and upper part of leaf stalks.
   - Flowers in umbels.
   - Fruit 5-7 mm. across, red.



Habitat & Distribution: Common in most regions. Absent from the northern boreal forest. Grows in moist, rich open woods, clearings, along borders of woods, on river banks, in ravines and coulees, also grows on light, often sandy soil.

Forage Value: Fair, both *Prunus* species nutritious throughout the growing season, protein levels remaining between 7 and 13% during fall and winter; utilization by game is generally heavy, livestock use somewhat less frequent due to bitter tasting leaves and twigs; new growth and leaves of both pin cherry and choke cherry contain HCN early in the season and again after frost or injury, and poisoning, although not common, can occur if large amounts are ingested during toxic periods; sheep and cattle are most often affected, lethal doses inhibiting body cells from taking oxygen from the blood, and death resulting from respiratory paralysis.

Grazing Response: Decreasers, both species moderately resistant to browsing pressure, but not highly competitive and declining under continued heavy utilization.

Notes: *Prunus*, the Latin for plum, specific names of both species meaning of Pennsylvania, of Virginia; the common name choke cherry appropriate because of the bitter, astringent tasting berries; native people mixed the fruit with meat in pemmican, and otherwise used choke cherry apparently exclusively but very extensively for medicinal purposes;

bark, especially the inner bark, and roots used to relieve headaches, for heart problems, consumption, phlegm congestion, bronchitis, coughs and lung problems; infusions were used as eye washes and the berries as a tonic and to treat diarrhea and sore throats, and chewed roots were placed on wounds to stop bleeding; the very hard wood was valuable for such items as digging sticks, tent pegs and household tools, and as it does not burn easily, was useful for lifting hot rocks and coals; *Prunus* species are well suited as ornamentals and for use in wind breaks, often with the added bonus of attracting birds seeking the fruit in the fall; reclamation value is also considerable, both species capable of stabilizing disturbed soil, reproducing readily from both seed and root suckers; propagation by seed can be difficult due to the hard seed coat and also possibly a germ dormancy.

ROSA L. - Rose

Common Characteristics

- Shrubs with prickles on stems and twigs, often with a pair of larger nodal spines.
- Leaves alternate, odd-pinnate with 5-11 toothed leaflets.
- Stipules leaf-like.
- Flowers large, pink, in cymes or solitary.
- Calyx constricted at the top, sepals 5, long-pointed, petals 5.
- Achenes bony, hairy, enclosed within the hypanthium that becomes enlarged, fleshy and red at maturity, known as a "hip".

Key to Rosa

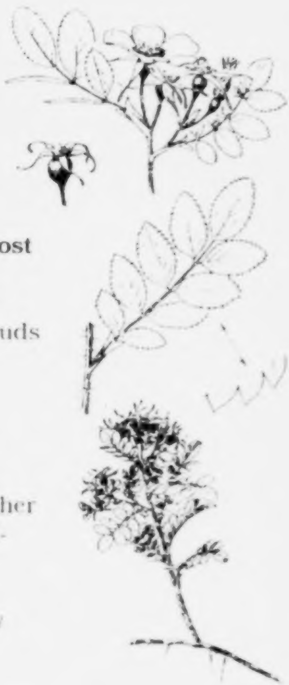
1. Stems often annual (dying back to near ground level annually); flowers 2-many; stem prickles to 3 mm. long, larger nodal spines absent; leaflets 9-11, teeth and lower surface not glandular; fruit mostly spherical. *R. arkansana*

   Stems perennial; flowers 1-3; stem prickles to 5 mm. long; leaflets 3-9, lower leaf surface and teeth mostly glandular. **2**

2. Stems mostly evenly prickly, without larger nodal spines; stipules glandular; leaflets 3-7, at least 25 mm. long; fruit mostly pear-shaped. *R. acicularis*

   Stems with larger nodal spines, the internodal prickles sometimes sparse, especially on new growth, this dark red-purple; stipules sparsely glandular; leaflets 5-9, to 25 mm. long; fruit spherical. *R. woodsii*

Rosa arkansana Porter - Prairie Rose



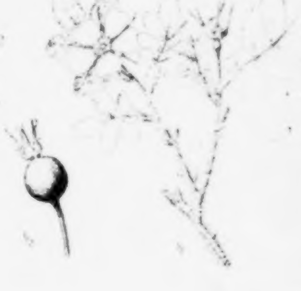
Growth Habit: **Low,** little branched **shrubs from well developed rhizomes, 2-4 dm. tall**, woody at the base, the aerial growth often mostly annual, dying back to near the base each year; **in other cases, plants mostly woody**, the stems persistent, and **reaching heights of 1-2 m., twigs and stems bristly, the bristles at most 3 mm. long, the nodal spines not larger**; young twigs red, sometimes glaucous, older stems red to grey; buds stalkless, pointed, with reddish, overlapping scales.

Blades: Leaves **9-11 pinnate**, with stipules varying from entire and hairless to apically glandular, hairy; leaflets rather **crowded, small (2-3 cm. long)**, oval-obovate, sharply toothed with thickened but not glandular teeth, hairless to sparsely hairy (especially below) but **not glandular**.

Inflorescence: Flowers **several** in corymbs, **mostly on current year's growth**; calyx often finely hairy and with a few stipitate glands; sepals to 2 (2.5) cm. long, also finely hairy and stipitate-glandular; petals **2-3 cm. long, rose to pink or white**; hips **red, mostly spherical**, the achenes especially hairy along one side.

Similar Species:

1. ***Rosa acicularis*** Lindl. ssp. ***sayi*** (Schw.) Lewis - Prickly Rose
   Frequently found in most regions, less common in the prairies. Grows in open woods, in shrubby thickets, in moist grassland, along rivers. Typically persists in mature forests, and is an indicator of some mesic conifer ecosites.

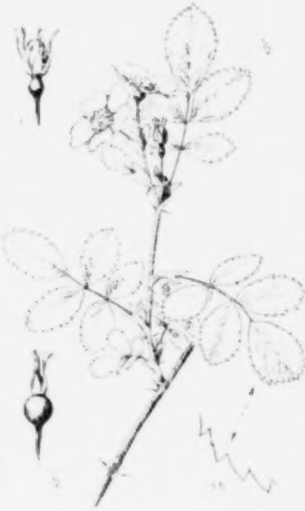


Distinguished by the following:

- Shrubs to 1.5 m. tall (or taller in wooded areas).
- Twigs and older stems with numerous bristles to 5 mm. long, but without larger spines at the nodes.
- Twigs reddish.
- Leaves with 3-7 oval-ovate to oblanceolate leaflets 3-4 cm. long.
- Stipules glandular on margins.
- Leaves finely hairy/glandular below.
- Flowers mostly solitary, pink.
- Fruit spherical to more often pear-shaped.

2. ***Rosa woodsii*** Lindl - Common Wild Rose

Distributed throughout most regions, often growing with one of our other species. Found in open woods, on moist coulee slopes, sometimes in sandy places.



Differs from *R. acicularis:*

- Large spines present at the nodes.
- Smaller internodal bristles present but often sparse, especially on new growth.
- Young twigs dark purple-red.
- Leaflets 5-9, to 5 cm. long.
- Stipules more sparsely glandular.
- Fruit spherical.

Habitat & Distribution: Common in all regions except absent from the boreal forest. Grows in open prairie grassland, in sandy places, often along roadsides. Larger plants with persistent, woody stems are more often found in areas with better moisture conditions (i.e. in sandy areas/those with an elevated water table).

Forage Value: Fair; nutritional levels, however, are favorable, protein averaging about 10-12% by August, phosphorus content higher than that of many grasses, although below that of aspen, and leaf fiber is low; palatability is moderate, although this varies from one species to the next, and surprisingly, the spiny branches on young growth are not a major deterrent to browsing, utilization more dependent upon the abundance of choice species; browsing by sheep and also deer and elk is often heavy, and open stands can be prone to extensive utilization on overgrazed pastures; moose make less use of roses, cattle usually find them less attractive but are known to make considerable use of *R. woodsii* in some cases.

Grazing Response: Increasers (all our species), resistant to heavy browsing, also protected to some extent from over-utilization, as the older woody growth is less palatable and has stiffer spines, hence often avoided; vegetative reproduction by rhizomes is strong, giving roses a competitive advantage when decreaser species are grazed off.

Notes: *Rosa*, the classical Latin name for roses; rose hips are exceptionally high in vitamins A and C, and were part of the diet of most native people, eaten raw or roasted, put into pemmican, and gathered in the winter for emergency food; the Blackfoot Tribe made a bitter drink from roots to treat diarrhea, flu, dysentery and worms; roots and leaves were taken as a spring tonic, root mixtures applied to relieve headaches and rheumatism, the blossoms used for stomach trouble and as an astringent, and cambium decoctions applied for eye disorders; various parts of the plant were used as poultices on wounds, to stop bleeding, and to treat insect stings; roses have exceptional ornamental value, although because of their aggressiveness, must be kept in check; reclamation potential is also considerable, all three species natural pioneers on disturbances where they enhance soil stability and control erosion, *R. arkansana* is valuable on dry, sandy sites, *R. woodsii* and *acicularis* with relatively high moisture requirements; roses can be propagated readily from stem and root cuttings, also from seed although establishment is slower.

RUBUS L. - Raspberry; Dewberry

Common Characteristics

- Perennial shrubs or herbs (these often with woody bases), stems smooth to bristly.
- Leaves stipulate, simple to compound, usually toothed.
- Flowers perfect or imperfect, regular, variously arranged.
- Petals 5, white, pink or reddish; sepals 5.
- Ovaries superior.
- Fruit fleshy, an "aggregate" or raspberry.

Key to Rubus

1. Shrubs to 2 m. tall. 2

Plants mostly herbaceous above the base, less than 3 dm. tall. 3

2. Stems without bristles; leaves 1-2 dm. broad, simple and lobed; petals 15-20 mm. long. *R. parviflorus*

Stems with bristles; leaves compound, 3-5 divided; petals to 12 mm. long. *R. idaeus*

3. Leaves rounded, with several shallow lobes; flowers unisexual; bog species. *R. chamaemorus*

Leaves 3-5 divided, not rounded; flowers usually perfect. 4

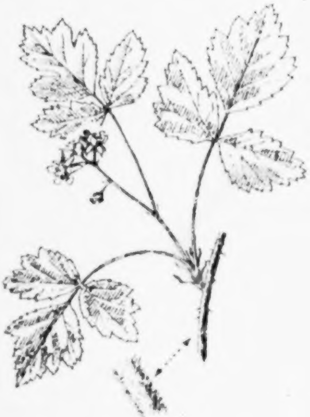
4. Plants with runners; leaves 5-divided; flowers white. *R. pedatus*

Runners absent or present; leaves 3-divided. 5

5. Stems with a perennial underground portion and herbaceous above; petals spreading, pink, 10-15 mm. long; leaves with rounded tips. *R. arcticus*

Stems reclining, long, somewhat woody; petals erect, mostly white, to 8 mm. long; leaves with pointed tips. *R. pubescens*

Rubus idaeus **L. ssp. *melanolasius*** **Focke - Wild Red Raspberry**



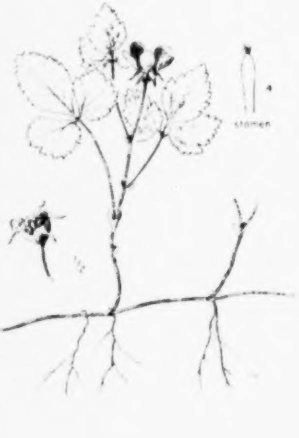
Growth Habit: Perennial **shrubs**, the stems (canes) usually biennial, growing to **2 m. tall**, usually **densely bristly-spiny**; young twigs reddish, often hairy and glandular, older branches hairless, yellow/reddish-brown, peeling; buds stalkless, the scales overlapping, brown, the terminal hairy.

Blades: Leaves **3-5 pinnate** (on new growth) **or mostly 3-foliate** (on reproductive shoots); stipules to 10 mm. long, linear, early deciduous; leaflets **ovate lanceolate, 3-10 cm. long**, pointed, the bases wedge-shaped to subcordate, **leaf axis and major veins below often bristly**; leaf margins coarsely toothed, leaves green and nearly hairless above, pale and usually white-woolly below.

Inflorescence: Flowers mostly several (2-4) in axillary and terminal racemes on second year growth; stalks and sepals bristly and glandular hairy; sepals 4-10 mm. long, reflexed; petals **4-12 mm. long, white**, erect-ascending; **fruit a fleshy red raspberry**.

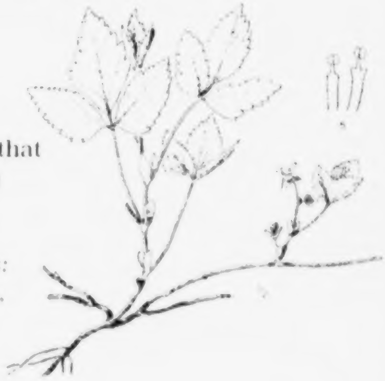
Similar Species:

1. ***Rubus arcticus*** L. ssp. ***acaulis*** (Michx.) Focke - Dwarf Raspberry
   Common in the foothills, montane and boreal forest ecoregions. Grows in swampy woods, in or near fens. Distinguished as follows:
   - Small, essentially non-woody plants 5-15 cm. tall, spreading by rhizomes.
   - Plants not bristly.
   - Leaves divided into 3 leaflets.

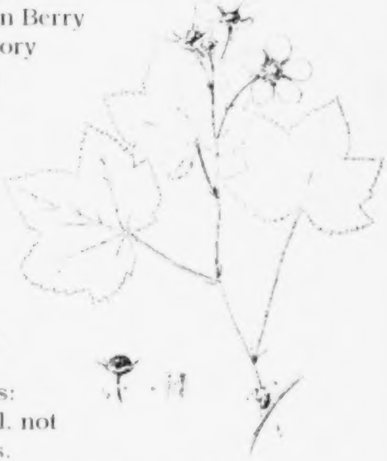


   - Leaflets 1.5-3.5 cm. long, ovate-obovate, the top roundish, the 2 lateral ones somewhat oblique.
   - Leaves toothed, with a few hairs above and below.
   - Sepals 8-11 mm. long, bent backward.
   - Petals 10-15 mm. long, deep rose.
   - Fruit a fleshy red raspberry.

2. ***Rubus pubescens*** Raf. - Dewberry; Running Raspberry
   Distribution similar to that of *R. arcticus*. Found in rich, moist upland sites.
   Differs from *R. arcticus:*
   - Plants rhizomatous, but also with reclining stems to 1 m. long, these often rooting.
   - Leaflets 3(5), 2-10 cm. long.
   - Leaflets long to short-pointed at the top.
   - Leaves usually hairless above.
   - Petals white (pale pink), shorter (to 10 mm. long).



3. ***Rubus parviflorus*** Nutt. - Thimbleberry, Salmon Berry
   Frequent as an understory species in the southern Rocky Mountains, also present in the Cypress Hills, southern boreal forest. Within its range, thimbleberry is an indicator of mesic-medium rich mixedwood and conifer ecosites.
   Distinguished as follows:
   - Shrubs 0.5-2 m. tall, not armed with prickles.
   - Leaves simple, rounded in outline, with shallow triangular lobes, toothed, 1-2 dm. wide.
   - Flowers large (to 3 cm. long), white, few, in long-stalked clusters.
   - Fruit 1.5-2 cm. broad, red, juicy.



Habitat & Distribution: Very common throughout most regions, less frequent in eastern portions of the prairies. Grows in moist woods and thickets, along borders of woodlands, also in disturbed, shaded areas: along roads and trails, in burned woodlands, in clearings. Usually associated with rich mixedwood or deciduous sites.

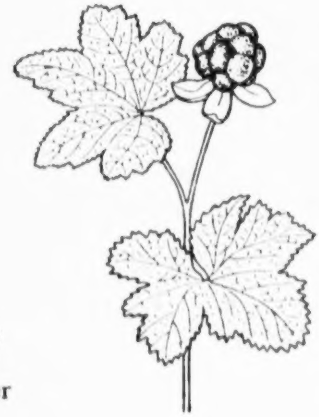
Forage Value: Poor to fair, nutritional quality generally moderate, but the bristly stems preventing extensive use; young growth as well as leaves and berries are readily eaten by game, consumed rather sparingly by livestock; non-bristly members of the genus are used considerably, but with the exception of *R. parviflorus*, are small and produce relatively little forage.

Grazing Response: Increasers, all our species resistant to moderate browsing pressure.

Notes: Syn. *R. strigosus; Rubus*, a Roman name, meaning red; fruits of all species were a delicacy to native people (but were too juicy to be preserved), flowers and young shoots also eaten; leaf and root infusions were used to treat diarrhea and vomiting, to prevent miscarriage, reduce labor pains and increase milk flow; raspberry leaves have rather remarkable properties for reducing cold symptoms and the berries are a well-known laxative; *Rubus* species perform well on disturbances, *R. idaeus* especially responding well on clearings and is adapted to a wide variety of soil and moisture conditions; it can be established quickly from stem and root cuttings, also propagated by seed although the hard seed coat requires scarification.

Rubus chamaemorus L. - Cloudberry

Growth Habit: Perennial herbs from creeping roots; stems low, 1-3 dm. tall, finely hairy, glandular above, mostly erect, unbranched.

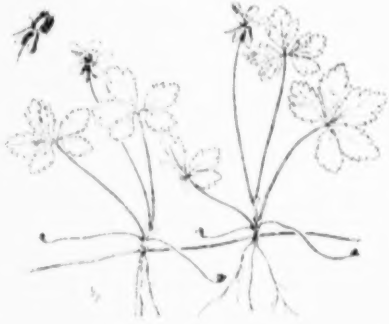


Blades: Lower stem with leaves absent, **having conspicuous reddish-brown stipules**; leaves 2-3 on upper stems, long-stalked, **circular-reniform, 3-9 cm. across, shallowly 5-9 lobed and serrate, the lobes (and apex) rounded**, the base cordate; **leaves firm, leathery, somewhat rugulose, dark green above, paler below, glabrous**.

Inflorescence: Flowers solitary, on long peduncles, **unisexual**; calyx 10-15 mm. long, glandular-pubescent, the sepals ovate; **petals white, about 10 mm. long; fruit reddish, becoming yellowish when mature; druplets rather few (6-18), large, with stones 4-5 mm. long**.

Similar Species:

1. ***Rubus pedatus*** J. E. Smith - Five-leaved Bramble
   Frequent in the southern boreal forest, especially at higher elevations. Also occasional in the southern Rocky Mountains. Found in moist woods.
   Distinguished as follows:
   - Low, slender plants with creeping, rooting stems to 10 dm. long.
   - Leaves 5-divided (pedate), the leaflets obovate, toothed.
   - Flowers white, solitary.
   - Sepals toothed, reflexed in fruit.
   - Fruit red, of 1-6 druplets.



Habitat & Distribution: Common but restricted to the boreal forest. Found mostly in peat/sphagnum bogs, sometimes in swampy or marshy wooded areas. An important indicator of nutrient-poor acid bogs.

Forage Value: Poor to fair, nutritional value rated as moderate, but both species producing relatively small amounts of herbage.

Grazing Response: Increasers, tolerant of moderate browsing pressure, but rather sparingly used under normal conditions, thus able to maintain vigor and reproductive capacity.

Notes: As with other members of the genus, human use of both species were varied and numerous, noted for their ability to reduce cold symptoms and treat stomach trouble; *R. chamaemorus* is a circumpolar species, also highly valued in the far north where berry producing species are rather scarce; it was collected and stored for winter use by Eskimos, known specifically to cure hives; the species is still prized today for making preserves, and although a rather poor berry producer, can occur in some regions in such abundance that worthwhile quantities of fruit can be gathered; both *R. chamaemorus* and *R. pedatus* provide valuable ground cover in climax communities, the former well suited to nutrient-poor acid bogs, the latter best adapted to moist wooded areas; both lend themselves well for use in moist, shaded gardens.

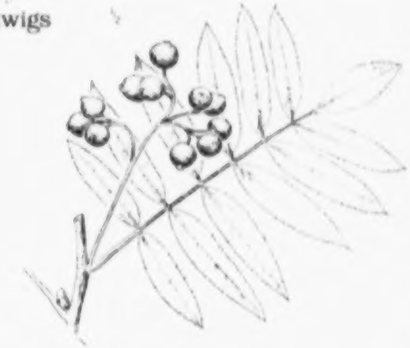
SORBUS L. - Mountain Ash

Common Characteristics

- Shrubs or small trees.
- Leaves alternate, deciduous, stipulate, pinnate, with 9 or more serrate leaflets.
- Flowers regular, perfect, arranged in numerous compound cymes.
- Hypanthium short, urn-shaped, disc-lined, with 5 small triangular sepals.
- Petals 5, white, small, spreading.
- Stamens numerous, carpels few (3-5), the ovaries compound and partially inferior, joined to the hypanthium.
- Fruit small, red-orange, a fleshy berry-like pome, 2-5 celled, with 1-2 seeds per locule.

Sorbus scopulina Greene - Western Mountain Ash

Growth Habit: **Shrubs 1-4 m. tall**, mostly erect, several-stemmed; **twigs reddish-brown, densely grey-white pubescent**; older bark red-grey, smooth, glabrous; winter buds conical, large, reddish-brown, **somewhat glutinous**, outer scales glabrous across the back, their tips and margins; inner scales white villose.



Blades: **Leaflets 11-13 pinnate, oblong-lanceolate, 3-5 cm. long, the apex acute to acuminate**, the margins sharply serrate for most of their length; leaves dark green and glabrous above, paler and glabrous to sparsely villose below; stipules green, somewhat membranous, linear, early deciduous.

Inflorescence: **Inflorescence of corymbs, flat-topped to somewhat rounded, 9-15 cm. broad, numerous-flowered**, the branches and calyx **pubescent with white hairs; petals 5-6 mm. long**; ovaries inferior; carpels 2-4; **fruit orange to scarlet**, subglobose, about 8 mm. across, **a fleshy berry-like pome**.

Habitat & Distribution: Occasional in the foothills and Rocky Mountain regions, more frequent in the boreal forest. Grows in forested areas, on moist wooded slopes, in ravines, in open woods.

Forage Value: Fair to good, deer and elk known to browse the plants quite readily, and the berries are a valuable source of food for birds.

Grazing Response: Increasers under normal conditions, usually capable of responding to clipping by producing an abundance of branches, resulting in lower growing, "bushy" shrubs.

Notes: *Sorbus*, a Latin term for a Mediterranean species of mountain ash; *scopulina* a reference to rocky habitat; the genus has been recognized as having medicinal value, all portions of the plant with astringent properties, the bark a well known tonic, useful for upset stomach and to cleanse the blood; the berries, although not as palatable as many others in the rose family, are edible and high in vitamin C; they are diuretic, but act as purgatives unless cooked; both introduced and native species are prized ornamentals, our western species can be readily grown at lower altitudes providing moisture requirements are met; they are especially showy late in the season, with their variegated foliage and red berries that attract migratory and winter birds.

SPIRAEA L. - Meadowsweet; Spiraea

Common Characteristics

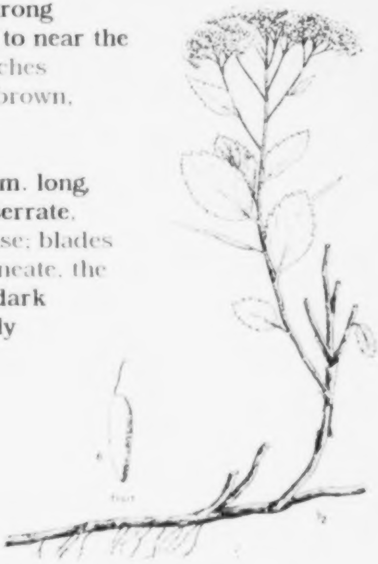
- Deciduous shrubs with simple, mostly toothed exstipulate leaves.
- Flowers small, perfect, perigynous, in compound corymbs or panicles.
- Hypanthium cup-shaped, free from (not joined to) the ovary, about as long as the 5 lobes.
- Petals 5, white to dark pink.
- Stamens 15 or more, carpels 5, not united, attached to the bottom of the hypanthium.
- Ovaries superior, the ovules 2-several.
- Fruit a small leathery follicle, opening ventrally, usually 4-seeded.

Key to Spiraea

1. Low shrub of forested areas, 2-8 dm. tall; leaves ovate-obovate; flower clusters flat-topped. *S. betulifolia*

Taller shrub of parkland areas, to 2 m. tall; leaves narrowly oblanceolate; flower clusters elongate. *S. alba*

Spiraea betulifolia Pallas - White Meadowsweet



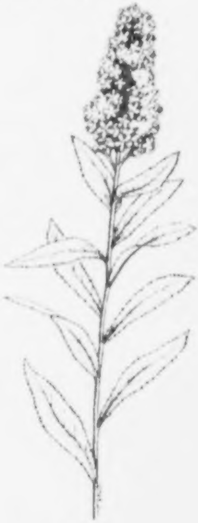
Growth Habit: Shrubs **2-8 dm. tall from strong rhizomes, often dying back to near the base each year**; young branches glabrous, purplish/reddish-brown, later shredding.

Blades: Leaves **ovate-obovate, 2-7 cm. long, coarsely and often doubly serrate**, sometimes entire toward base; blades short-petioled, the bases cuneate, the apex acute; thin, glabrous, **dark green above, paler and finely reticulate-veiny below**.

Inflorescence: Corymbs **3-8 cm. across, broad and mostly flat-topped**; calyx mostly glabrous externally, finely pubescent within, the lobes triangular; petals **white, about 2 mm. long**, not strongly scented; **follicles about 3 mm. long**, somewhat pubescent along suture.

Similar Species:

1. ***Spiraea alba*** Du Roi - Narrow-leaved Meadowsweet
   Found in the parkland region. Grows in moist woods and on shores, often in sandy soil.
   Differs as follows:
   - Plants taller, to 2 m. high.
   - Blades narrower (narrowly oblanceolate), finely serrate.
   - Inflorescence elongate, conical to ovoid in outline.



Habitat & Distribution: Common in the foothills/Rocky Mountain region, southern boreal forest. Grows on rocky slopes and hillsides, in open woods (mixedwood and coniferous), often a component of climax coniferous forests, usually an indicator of mesic moisture regimes.

Forage Value: Poor, having minimal value to both livestock and game primarily because of low palatability due to a bitter volatile oil content in leaves; the species is widespread and usually abundant, also remains green later in the season than most deciduous plants; on this basis, it is sometimes considered useful as emergency browse.

Grazing Response: Increasers.

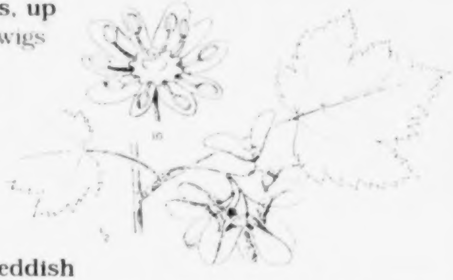
Notes: Syn. *S. lucida*; from the Greek *speira*, translating spire or wreath, some species used in making garlands; the specific as well as the alternate common name 'birch-leaved" spiraea allude to the leaf shape; the species is listed as having some medicinal properties, used by native people in the treatment of venereal disease, tea used as an enema and tonic, and the foliage taken for stomach problems; the plants contain aspirin-like methyl salicylate, a well-known pain killer; various species, particularly those with rose-colored flowers, are widely grown as ornamentals, also can be recommended as shade tolerant shrubs for reclamation work in wooded regions.

ACERACEAE - Maple Family

Common Characteristics

- Deciduous trees or shrubs with opposite branches.
- Bark grey, smooth to rough.
- Leaf scars distinctly "U"-shaped.
- Blades opposite, simple to compound, exstipulate.
- Flowers in racemes, corymbs, or umbels.
- Flowers regular, perigynous, unisexual (ours), the plants monoecious to dioecious.
- Sepals mostly 5, separate or connate.
- Petals 5, small or absent.
- Stamens 4-10, usually 8, the staminate flowers often with a rudimentary pistil.
- Ovary superior, the pistil 1, 2-carpellary, 2-loculed, flattened.
- Styles 2, united.
- Fruit of 2 basally united samaras, these developing elongate wings, each 1-seeded.

Acer glabrum Torr. - Mountain Maple



Growth Habit: **Shrubs or small trees, up to 10 m. tall**; young twigs reddish, glabrous, becoming grey; bark grey, smooth; winter buds short-pointed, 3-6 mm. long, the lateral opposite.

Blades: Leaves thin, **at first reddish** and sparsely glandular-pubescent, later glabrous and green, paler with yellow veins below; **blades 2-14 cm. long**, long-stalked, **cordate, simple, palmately 3-5 lobed and acute-acuminate, the margins doubly serrate**.

Inflorescence: **Flowers 5-15 per corymb**, appearing with leaves in leaf axils; **plants monoecious or dioecious**, the staminate usually with rudimentary pistils, but the pistillate with well developed but sometimes sterile stamens; **petals present or absent; samaras 2-4 cm. long, the wings not greatly divergent**.

Habitat & Distribution: Found in the southern Rocky Mountain region. Grows in montane areas; on moist wooded slopes, on rocky ridges.

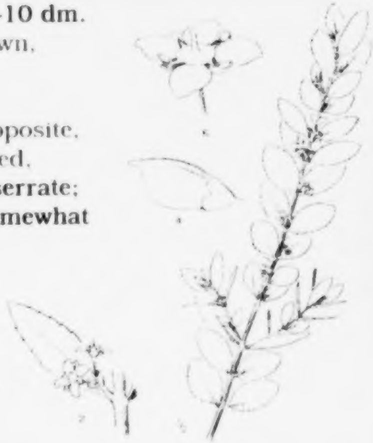
Forage Value: Fair for domestic livestock, fair to good for wild ungulates, the foliage frequently used during spring and summer, and woody growth an important source of winter browse.

Grazing Response: Increasers, resistant to moderate browsing.

Notes: *Acer*, the Latin for maple, *glabrum* from glaber, a reference to the hairless mature foliage; also known as Douglas Maple, in honor of its discoverer, David Douglas; the genus, in particular larger species of lower elevations, is probably best known for its production of maple syrup, also its value as a hardwood; adapted to relatively high elevations and tolerant of shade, mountain maple can be grown successfully as an ornamental in foothills and montane regions, prized especially for its brilliantly colored autumn foliage.
Note: The windbreak species Manitoba maple - *Acer negundo* L. is native in eastern Alberta and eastward; leaves are divided pinnately 3-5 times.

CELASTRACEAE - Bittersweet Family

Pachistima myrsinites (Pursh) Raf. - Mountain Lover



Growth Habit: **Erect or prostrate shrub, 2-10 dm. tall**: branches glabrous, brown, 4-ridged.

Blades: **Leaves evergreen**, mostly opposite, glossy, glabrous, short-stalked, **oval-elliptic, 1-3 cm. long, serrate; blades leathery, margins somewhat revolute, thickened**.

Inflorescence: Flowers **numerous**, in **axillary clusters, small, petals 4, reddish, to 1.5 mm. long**, sepals 4, to 0.7 mm. long; stamens 4, inserted on a fleshy disc; ovary superior, 2-loculed, pistil 1, style short; **fruit a small 1 or 2-seeded, ovoid capsule**, this opening by 1 or 2 valves.

Habitat & Distribution: Found in the southern Rocky Mountains where sometimes abundant as an understory species in mature coniferous forests.

Forage Value: Poor, essentially unpalatable, important only because it is sometimes abundant, and in these situations can provide emergency browse; there have been some reports of poisoning when the plants are excessively utilized but no detailed studies have been undertaken to determine the poisonous principle and relative toxicity.

Grazing Response: An increaser.

Notes: From the Greek *pachus*, thick, and *stigma* (stigma); also known as myrtle box leaf; pachistima is highly prized as an ornamental, both because of its long-lasting, evergreen foliage, and the small but surprisingly attractive flowers; plants can be readily propagated from seed, layering and cuttings; the species is best adapted to moist, well-drained sites, also tolerates trimming and shaping into low hedges; in recent years there has been an increasing demand for the foliage for use in florist arrangements.

RHAMNACEAE - Buckthorn Family

Common Characteristics

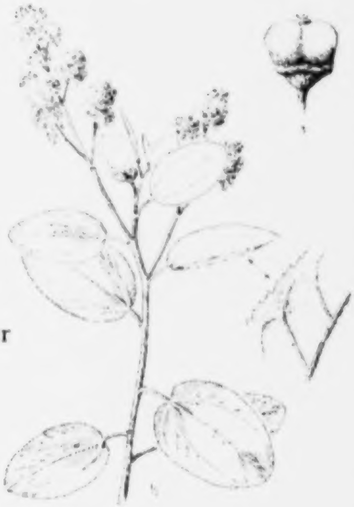
- Trees or shrubs with mostly alternate leaves.
- Leaves simple, mostly with stipules.
- Flowers perfect or unisexual, small, regular, perigynous.
- Flower parts in 5's, petals sometimes absent.
- Stamens 5(4), inserted on a disc.
- Pistil 1, the ovary located on or embedded in the disc, with 2-4 locules, each of these with a basal ovule.
- Fruit a dry capsule or berry-like drupe.

Key to Rhamnaceae

1. Leaves alder-like, deciduous, the veins pinnate; flowers solitary or few in leaf axils; fruit black, juicy. *Rhamnus*

Leaves evergreen, firm, with 3 veins from the base; flowers numerous in terminal panicles; fruit a dry nutlet. *Ceanothus*

Ceanothus velutinus Dougl. *ex* Hook. - Snow Brush; Deer Brush

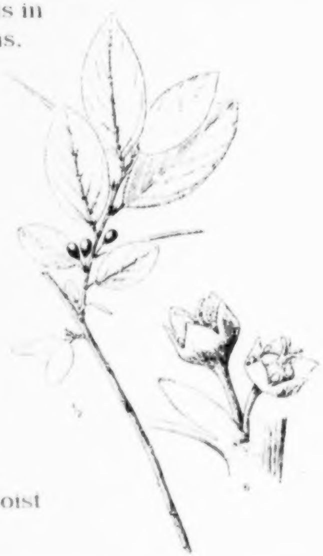


Growth Habit:	**Spreading shrubs, 1-3 m. tall**, usually in dense colonies; twigs finely hairy to glabrous, olive green.
Blades:	**Blades evergreen, heavy-scented**, alternate, **ovate-elliptic, with 3 conspicuous veins arising from the base**; leaves 3-8 cm. long, **glandular-toothed, glossy-dark green above, paler and from grey-hairy to glabrous below**.
Inflorescence:	**Flowers in dense terminal panicles, white**; flower parts in 5's, **petals hooded** and with a long claw, **small**; ovary 3-loculed, style 3-cleft; **fruit a dry capsule, this 4-5 mm. long, glandular, separating into 3 dehiscent nutlets**, each with a flattened seed.

Similar Species:

1. ***Rhamnus alnifolia*** L'Her. - Buckthorn

   Found in moist, shaded woods in the southern Rocky Mountains, also in the boreal forest. Distinguished as follows:
   - Leaves alder-like, pinnately veined, not glossy, deciduous.
   - Flowers greenish, very small, plants dioecious, petals lacking.
   - Flowers solitary or in small clusters in leaf axils.
   - Fruit a juicy black berry 7-9 mm. long.



Habitat & Distribution:

A montane species, found in the southern Rocky Mountains on moist wooded slopes.

Forage Value:

Poor for domestic livestock; snow brush is utilized to some extent by wildlife but usually in cases where palatable feed is in short supply, deer occasionally cropping the summer foliage, elk use mostly restricted to the dormant season; in some regions the shrubby growth is recognized as important habitat; utilization of *Rhamnus* is similar, the fruit considered toxic.

Grazing Response:

Increasers; in areas where snow brush is best adapted, it can increase and in time replace more valuable species when overgrazing weakens stands and reduces vigor; in forested situations, however, it is considered to be a rather poor competitor.

Notes:

The generic name is a Greek term for some spiny shrub, *velutinus* a reference to the sometimes velvety-hairy leaves; *Ceanothus* has long been recognized as a tea substitute, also an ingredient in tobacco mixtures and flowers have been used to make soap; medicinally, leaf infusions have been taken to stimulate the digestive system, and root decoctions are supposedly effective in treating various cysts, known primarily as a lymphatic remedy; use of *Rhamnus* has been more limited due to the toxic nature of the berries, the inner bark , however, is apparently cathartic; both species are very attractive, having excellent soil binding properties and are considered important for watershed protection.

CACTACEAE - Cactus Family

Common Characteristics

- Herbaceous succulent perennials (ours) with spines and stems either jointed or cushion-like.
- Leaves absent, (sometimes small, early deciduous).
- Flowers showy, solitary, perfect, regular.
- Sepals and petals numerous, both overlapping.
- Stamens numerous.
- Fruit a many-seeded berry, either dry or fleshy, edible.

Key to Cactaceae

1. Plants branched and jointed, stems mostly flattened; flowers yellow. *Opuntia*

Plants spherical-cushion-like; flowers pink-purple. *Coryphantha*

OPUNTIA Mill. - Cactus ; Prickly Pear

Common Characteristics

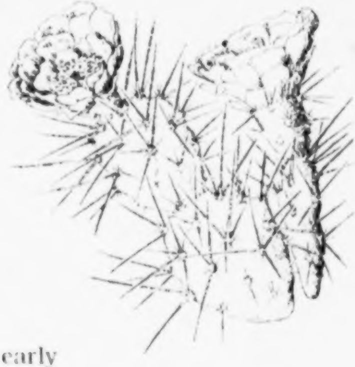
- Stems branched and jointed, often flattened.
- Leaves scale-like, spirally arranged, early deciduous.
- Areolae (cushions) with both large and smaller spines, these slightly barbed.
- Flowers borne in areolae of previous year's growth.
- Hypanthium bell-shaped, with areolae and small spines, extending to the summit (but not above) of the ovary.
- Flowers yellow to reddish-tinged.
- Fruit spiny, egg-shaped, dry, to 3 cm. long, with flattened seeds.

Key to Opuntia

1. Segments of stems 2-5 cm. long, little flattened, readily breaking apart. *O. fragilis*

Segments of stems 5-12 cm. long, distinctly flattened, not easily breaking apart. *O. polyacantha*

Opuntia polyacantha Haw. - Prickly Pear



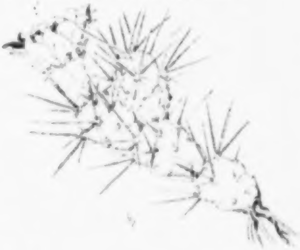
Growth Habit: Plants with **prostrate stems, spreading to several metres long**, forming matted clumps 1-3 dm. tall; stem **segments circular-obovate, distinctly flattened, 5-12 cm. long** and about 1 cm. thick, **not readily detached**; areolae (cushions) **with grey-yellow wool and 5-9 stout spines**.

Blades: Scale-like, spirally arranged, early deciduous.

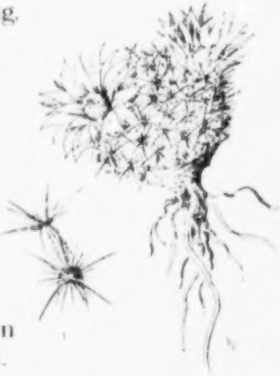
Inflorescence: Flowers **yellow, often pink-tinged, 4-7 cm. long**; fruit **egg-shaped, dry, spiny**, about 2.5 cm. long.

Similar Species:

1. ***Opuntia fragilis*** (Nutt.) Haw. - Brittle Prickly Pear

   Occasional in the prairie and parkland regions. Found in dry prairie grassland.
   Differs as follows:
   - Joints of stems smaller, less than 5 cm. long, only slightly flattened, readily breaking apart.
   - Spines more evidently barbed.
   - Areolae more crowded, with whiter hairs.
   - Flowers smaller, 3-5 cm. long, more evenly yellow.
2. ***Coryphantha vivipara*** (Nutt). Britt. and Brown - Cushion or Ball Cactus

   Frequent in the prairies, grows in dry grassland, on dry, often rocky hillsides, in sandy places.
   Distinguished as follows:
   - Spherical cushion-like plants, solitary or more often several tufted, to 5 cm. high.

- Plants covered with spine-tipped projections.
- Spines in groups, 3 larger, also smaller marginal ones.
- Petals bright red-purple, 2.5-3 cm. long.
- Fruit a smooth brownish fleshy berry.

Habitat & Distribution: Frequent in the prairies, also present in southern portions of the parkland. Found in dry prairie grassland, on dry river breaks, in sandy grassland and in dunes where sometimes a major component.

Forage Value: Poor; although nutritious and with a high mineral content, cactus is essentially unavailable to grazing animals because of the spines; in emergency situations, spines are singed off and plants are readily eaten, also providing a valuable source of water (water content can be as high as 80%), although the high mineral content can cause scours if large amounts are ingested; cactus is used by small mammals who play a large part in seed dispersal.

Grazing Response: Increasers; cactus is very resistant to drought, both by virtue of its small (or absent) leaves which reduces the evaporation surface, and the extensive, wide-spreading root system; *O. polyacantha* is especially aggressive on overgrazed range, and its abundance reduces the availability of other forage.

Notes: *Opuntia*, Greek, because members of the genus grew near Opus, Greece, or Tournefort's name for succulent plants from the area; the specific name from *poly*, many, and *canthus*, wheel, probably a reference to the radiating spines; fruit from all species was eaten by native people, that of *Coryphantha* especially palatable and still used today; cactus pulp was also eaten, one method of removing spines was to boil the joints, then peel back the skin; pulp was taken to treat lung problems, and poultices were applied to wounds and bruises; juice of *Opuntia* species was used for its anti-inflammatory and diuretic properties, and there are some reports of traditional treatment for adult onset diabetes involving the use of prickly pear; native cactus flowers make a spectacular showing on the prairie landscape in the spring, and are frequently transplanted into arid flower gardens; *Opuntia* species, and to a lesser extent cushion cactus, are aggressive pioneers on exposed soil, re-establishing from joints when plants are scattered by mechanical disturbances; *O. polyacantha* is especially valuable in stabilizing sandy soil.

ELAEAGNACEAE - Oleaster Family

Common Characteristics

- Deciduous shrubs or small trees with nitrogen-fixing nodules on roots.
- Plants with silvery or rusty scales, or star-shaped hairs, also sometimes spiny.
- Blades simple, opposite or alternate.
- Flowers perfect or unisexual, petals lacking, calyx 4-lobed.
- Stamens 4 or 8.
- Ovary superior.
- Fruit drupe-like, composed of a single dry achene surrounded by a fleshy or mealy hypanthium.

Key to Elaeagnaceae

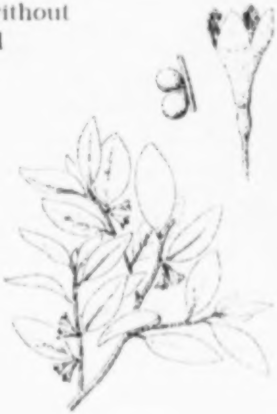
1.	Leaves alternate, stamens 4.	*Elaeagnus*
	Leaves opposite, stamens 8.	*Shepherdia*

ELAEAGNUS L. - Oleaster

Common Characteristics

- Small trees or shrubs with alternate leaves.
- Winter buds small, with a few (2) elongate outer scales.
- Foliage with silvery or brown scales.
- Flowers several, in axils of new growth, mostly perfect.
- Calyx tube about twice as long as the lobes, constricted above the ovary.
- Stamens 4, not exserted.
- Fruit mealy-dry, containing an egg-shaped stone.

Elaeagnus commutata Bernh. *ex* Rydb. - Silver-berry; Wolf Willow



Growth Habit: Spreading-erect shrub **to 4 m. tall**, without spines, **from extensive rhizomes and forming colonies; young twigs brownish/rusty-silvery scaly, becoming silver with age**; buds egg-shaped, without true scales, covered by 2 elongate smaller leaves.

Blades: Leaves **alternate, lanceolate-oblanceolate, 2-8 cm. long**, pointed to blunt, the margins **entire, often wavy**; blades **silver on both surfaces, sometimes brownish-scaly below**.

Inflorescence: Flowers 2-3 per cluster, on stalks 1-2 mm. long, deflexed, **with 4 sepals**, the tube longer than ovary; **petals absent**; flowers **to 1.5 cm. long, strongly but pleasantly scented, yellow within, silvery below**, both perfect and unisexual; fruit **obovoid, about 1 cm. long, dry, mealy-silvery**, with a hardened stone.

Habitat & Distribution: Occasional occurrences in the boreal forest, common southward. Grows in grassland, on shrubby slopes, in ravines and on banks, along streams and gravel or sand bars, also in lighter/sandy soil where moisture is adequate. Known, especially in western regions, as a species of fluvial sites, often associated with balsam poplar or white spruce.

Forage Value: Fair, protein levels are favorable during summer, but fall considerably later in the season; silver-berry contains oils that tend to reduce digestibility and consequently lower nutritional values to some extent; palatability is rated as moderate, used primarily as winter browse by deer, elk and moose, utilization dependent upon abundance of choice species.

Grazing Response: An increaser, resistant to moderate browsing and forming rather extensive colonies as climax grasses decline; in choice habitats *E. commutata* is often naturally abundant and does not always necessarily indicate over utilization.

Notes:

From *elaia*, olive, and *agnos*, the Greek name for Chaste Tree, which has similar foliage; *commutata* translates changed, alluding to the silvery foliage, "changed" from the usual green; the rather tasteless fruits were sometimes cooked with moose fat, also a source of emergency food for native people, and seeds were used in beadwork; the name "stink wood" has been given to the species apparently for the foul odor of the burning wood; silver-berry has been used for wind breaks, ornamentals, and is valued in revegetating disturbances, especially recommended on loose, sandy soil, also on steep, erodable slopes provided moisture requirements are met; the species shows moderately aggressive rhizome growth, although not highly competitive, and its nitrogen-fixing ability is beneficial in improving soils; plants are readily propagated by root and twig cuttings, also by seed, although this process is somewhat slower.

SHEPHERDIA Nutt. - Buffalo-berry

Common Characteristics

- Dioecious, deciduous shrubs or small trees, sometimes thorny.
- Buds stalked, with a pair of small leaf-like scales.
- Leaves opposite, entire, on short stalks.
- Flowers several in leaf axils of previous year's growth, appearing before leaves.
- Staminate flowers with 4 spreading lobes and 8 stamens.
- Pistillate flowers usually few, with short erect lobes.
- Fruit drupe-like, fleshy, with one stone.

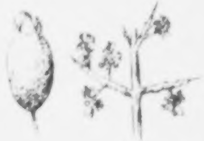
Key to Shepherdia

1. Plants with stout thorns; leaves silvery on both surfaces; prairie species. *S. argentea*

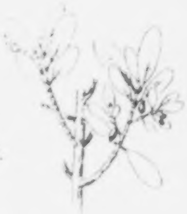
Plants without thorns; leaves green above, silvery/rusty below; widespread, absent from the prairies. *S. canadensis*

Shepherdia argentea Nutt. - Thorny Buffalo-berry

Growth Habit: **Shrubs or small trees, 3-6 m. tall**, the branches spreading-ascending; branches **with stout spines**, the **young twigs silvery**, and **older bark silvery to brownish**, buds with 2 smaller silvery leaves.



Blades: Leaves **lanceolate or oblong-oblanceolate, 2-5 cm. long**, the top blunt, the base wedge-shaped, margins entire; leaves **silvery-scruffy on both surfaces**.



Inflorescence: **Male and female flowers on separate plants**, petals absent, **sepals 4, 1-2 mm. long, brownish inside, yellowish-scruffy outside**; fruit **juicy**, narrowly oval, **4-6 mm. long, yellow-orange to reddish, edible, sour**.

Similar Species:

1. ***Shepherdia canadensis*** (L.) Nutt. - Canadian Buffalo-berry
   Common in all regions except absent from the prairies. Grows in open woods, on wooded banks and slopes, on shores and gravel bars. High cover values in western regions indicates subxeric ecosites. Distinguished as follows:
   - Spreading-bushy shrubs to 3 m. tall.
   - Plants without spines.
   - Young twigs densely rusty-scaly, older branches reddish-brown to grey.
   - Blades ovate-lanceolate, 2-5.5 cm. long, the margins somewhat wavy.
   - Blades rusty-scaly below, mostly green above.
   - Flowers brownish inside, yellowish-rusty outside, about 4 mm. long, appearing in early spring before leaves.
   - Fruit yellow-red, juicy, 4-6 mm. long.

Habitat & Distribution: Common in the prairies, north to southern portions of the parkland region. Grows in moist places: along streams and canals, in open woods, on shrubby coulee slopes, on river flats.

Forage Value: Poor (both our species), analysis indicating poor to fair nutrient levels, and palatability also low for game and livestock; the absence of spines on *S. canadensis* makes the species somewhat more usable, although it is still browsed only sparingly even when more attractive species are scarce; berries are a valuable food source for birds, those of *S. canadensis* also eaten by bears.

Grazing Response: Increasers, showing fair regrowth after browsing, overall low utilization gives plants a competitive and reproductive advantage.

Notes: Named in honor of the English botanist, John Shepherd (1764-1836); *argentea* means silvery; members of the genus also called soap berry, referring to the frothing nature of the berries; also known as bull-berry, both this and the name buffalo-berry because buffalo were apparently fond of the fruit; Indians used the berries raw, in pemmican and dried them into cakes for winter use; they were also eaten to relieve constipation and stomach problems; in some regions the berries were used to produce a red dye; *Shepherdia* species are planted for ornamental purposes, also have some suckering properties, and often readily establish on disturbances; *S. argentea* is valuable for binding loose soils along water courses, tolerant of moderately alkaline conditions; as with *Elaeagnus*, both species fix atmospheric nitrogen.

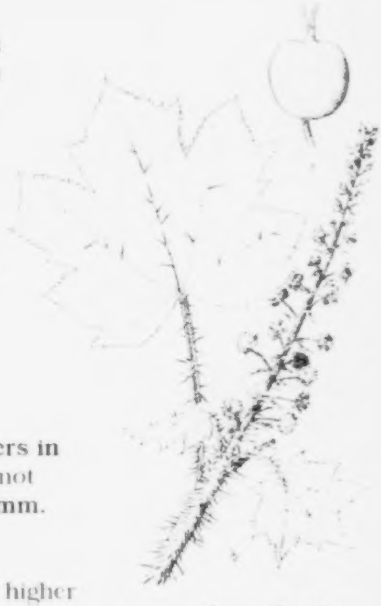
ARALIACEAE - Ginseng Family

Common Characteristics

- Herbaceous or woody perennials, sometimes rhizomatous.
- Leaves simple or compound, alternate (ours)
- Inflorescence umbel-like.
- Flowers small, greenish, regular, perfect or imperfect.
- Calyx lobes, petals, stamens and styles each 5.
- Fruit berry-like.

OPLOPANAX (T. & G.) MIQ. - Devils-club

Oplopanax horridum (Sm.) Miq. ssp. ***horridum*** - Devil's-club



Growth Habit: Shrubs 1-3 m. tall, coarse, with a strong sweetish odor; plants **with dense yellowish spines and prickles**; stems thick and tangled.

Blades: Leaves long-stalked, alternate, **1-3 dm. wide, cordate-based and 5-7 palmately lobed**; lobes acuminate, **margins unevenly serrate; ribs below with prickles**.

Inflorescence: **Flowers in large terminal clusters 1-3 dm. long; flowers in umbels, greenish**; styles 2, not united, carpels 2; **fruit 4-5 mm. long, red**, 2-seeded.

Habitat & Distribution: A species tending to occupy higher elevations in the boreal forest, also in the southern Rocky Mountains. An indicator of subhygric sites and usually those with seasonal seepages. Associated with white spruce/ balsam fir forests.

Forage Value: Poor, capable of inflicting mechanical injury, but usually occurring in peripheral rangelands, thus seldom encountered by livestock.

Grazing Response: An increaser.

Notes: *Oplopanax*, from the Greek *hoplon*, weapon, and *Panax*, a related genus; the specific name as well as the generic obviously a reference to the wicked spines known to work into the skin and cause infection; a nevertheless medicinal species, widely used by various native peoples, known as a counter-irritant, effective against stomach ulcers, diabetes, tuberculosis, thyroid problems, constipation; external uses involved treatment of wounds, rheumatism and arthritis; the species was regarded by some to possess magical powers, to bring good luck, and was an ingredient in face paint for ceremonial rituals; *Oplopanax* shows promise for ornamental purposes in moist shaded gardens.

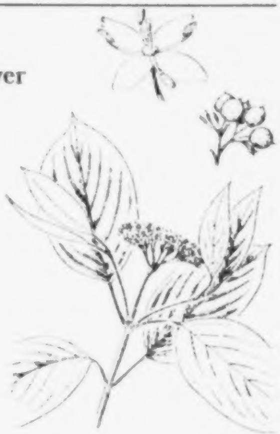
CORNACEAE - Dogwood Family
CORNUS L. - Dogwood

Common Characteristics

- Trees, shrubs or herbaceous-subshrubs.
- Leaves simple, opposite or in terminal whorls, stalked, the venation rather prominent (pinnate), exstipulate.
- Flowers small, regular, perfect.
- Sepals 4, very small, petals 4, white, sometimes also a conspicuous involucre present.
- Stamens 4.
- Fruit fleshy, red or white, a 1 or 2-seeded drupe, the wall hardened, stone-like.

Cornus stolonifera Michx. - Red Osier Dogwood

Growth Habit: **Sprawling-spreading shrubs 1-3 m. tall**, the branches numerous, the **lower sometimes reclining and rooting**; young twigs **deep red, sometimes greenish or purple**, with pale rings at the nodes, finely hairy and with some hairs attached by the middle; older branches similar, hairless, with very old bark grey, smooth or becoming furrowed into thick flat plates; buds grey-brown, terminal flower buds stalked, bulb-like, the lateral leaf buds narrower, stalkless.



Blades: Leaves opposite, **ovate-oval to obovate-lanceolate**, pointed to long-pointed, **4-12 cm. long, dark green above, paler-glaucous below**, with scattered rough hairs attached by the middle, sometimes nearly hairless above.

Inflorescence: Flowers **in flat-topped cymes**, without bracts; petals **white, 2-4 mm. long**; fruit **white or bluish-tinged, nearly spherical, 5-6 mm. long, fleshy**, the stone somewhat flattened.

Habitat & Distribution: Common and widely distributed.
Grows in moist woods and thickets, on lush coulee slopes and banks, along rivers and streams where typically associated with balsam poplar; prefers moist, poorly drained soils.

Forage Value: Good; nutritional elements are good and remain so into fall and winter; considered one of our most valuable browse species, red osier dogwood is relished by livestock and game, particularly by deer and moose; studies indicate that deer are especially dependent upon the species, which is often also an important part of their summer diet.

Grazing Response: An increaser #1, resistant to heavy browsing, also readily sprouting from stolons and reclining-rooting branches, but is sometimes utilized to such an extent that it decreases in prominence.

Notes: *Cornus*, in Latin, means horn or antler, supposedly a reference to the hard wood, or, alternately, comparing the congested inflorescence of some species to a *cornus*, a knob on the ends of ancient manuscript cylinders; the specific name means stolon-bearing; traditional uses of the plants varied, the berries, although not palatable, were eaten, the inner bark used in "kinnikinnick" smoking mixtures, known for its narcotic effects; the cornic acid content of the bark has properties similar to those of ASA, and was used for a number of complaints; root decoctions were effective against diarrhea, also used as an astringent and for chest problems; the bark supposedly helped cure liver disorders, also was a well known laxative; the very hard wood was utilized in the construction of small tools, pipestems and arrows; dogwood is often grown as an ornamental, is also recommended as a reclamation species; it can be established most successfully by stem and root cuttings provided the high moisture requirements are met.

ERICACEAE - Heath Family

Common Characteristics

- Shrubs with alternate, exstipulate leaves, these often persistent (evergreen) and leathery.
- Flowers mostly regular, perfect, the parts in 4's or 5's.
- Sepals and petals mostly united, sometimes distinct to the base, the corolla (when united) from saucer-shaped to urn-shaped.
- Stamens usually twice as many as corolla lobes.
- Ovary superior (inferior in one group).
- Fruit varying: a fleshy berry, a drupe, or a capsule.

Key to Ericaceae

1. Ovary inferior; fruit fleshy. 2

Ovary superior; fruit various. 3

2. Stems erect or creeping; corolla cup to urn-shaped. *Vaccinium*

Stems creeping and very slender; corolla deeply divided, with reflexed lobes. *Oxycoccus*

3. Leaves rusty-hairy below; flowers white, in clusters, petals not joined. *Ledum*

Petals united. 4

4. Trailing shrubs with fleshy, red fruit. *Arctostaphylos*

Fruit a dry capsule. 5

5. Flower parts in 4's; corolla small, urn-shaped, greenish-bronze. *Menziezia*

Flower parts in 5's; corolla larger, 10-20 mm. wide, white. *Rhododendron*

ARCTOSTAPHYLOS Adans. - Bearberry

Common Characteristics

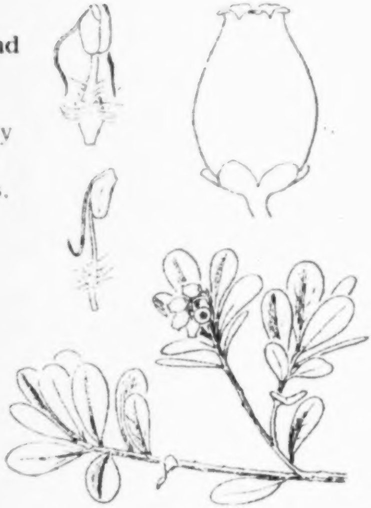
- Small creeping or tufted shrubs,the stems often reclining and creeping, usually crooked, brownish to reddish-purple, shredding with age.
- Leaves alternate, persistent or deciduous.
- Flowers mostly in terminal panicles or racemes, each with a scaly bract; parts in 4's or 5's.
- Sepals nearly distinct, the corolla urn-shaped, with short spreading lobes.
- Ovary superior, anthers with 2 reflexed awns.
- Fruit a berry-like drupe, red, spherical, to 10 mm. across, with 5 stony 1-seeded nutlets.

Key to Arctostaphylos

1. Leaves deciduous (mostly so), thin, conspicuously reticulate-veined, toothed; branches glabrous; fruit juicy. *A. rubra*

Leaves evergreen, firm, not evidently veiny; fruit dry-mealy; branches finely hairy. *A. uva-ursi*

Arctostaphylos uva-ursi (L.) Spreng. - Bearberry; Kinnikinnick



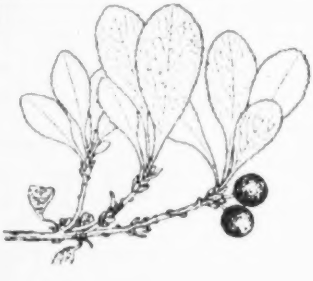
Growth Habit: **Reclining shrubs,** the **branches wide-spreading and rooting**, often forming mats several metres wide; twigs slender, reddish-brown, hairy and/or glandular, **shredding with age**; bud scales in pairs, light red.

Blades: Leaves **oblong or obovate-spatula-shaped**, the top **rounded-blunt, entire, 1-2.5 cm. long, thick and evergreen**; blades **dark green and glossy** above, **paler and hairless to finely hairy below**.

Inflorescence: Flowers in terminal, few-flowered racemes, each with a firm, thick bract; flowers **pink, urn-shaped, about 5 mm. long**, much exceeding the pinkish-tinged calyx lobes; flower **parts in 5's**; fruit **bright red, dull, dry and mealy**, 7-10 mm. across.

Similar Species:

1. ***Arctostaphylos rubra*** (Rehder & Wils.) Fern. - Alpine Bearberry
   Rather frequent in the Rocky Mountains, also in the northern boreal forest. Found from montane to alpine areas on moist slopes, on heaths.
   Differs as follows:
   - Branched, often prostrate shrub to 3 dm. tall.
   - Branches glabrous, winter bud scales evident.



- Leaves spatulate-obovate, 2-4 cm. long, toothed, veiny reticulate, thin, mostly deciduous.
- Leaves purple-red in fall, sometimes persistent.
- Flowers 2-4 per cluster, white.
- Fruit red, juicy, 5-10 mm. wide.

Habitat & Distribution: Common and widely distributed throughout most regions. Grows in moist to rather dry woods, on rocky or sandy hillsides and slopes, in sandy wooded areas. In many areas, significant cover of the species is an indicator of subxeric to submesic sites.

Forage Value: Fair, actual nutritional data unclear; the species is seldom used by livestock but rates considerably higher for game, often moderately used by deer and elk during winter months; heavy browsing for an extended season is an indication of a short forage supply; the berries of both species are important grouse and wild turkey food, also used by small mammals, and, as the common name suggests, eaten by bears.

Grazing Response: An increaser, utilization usually restricted to the extent that plants remain vigorous and retain reproductive capacity.

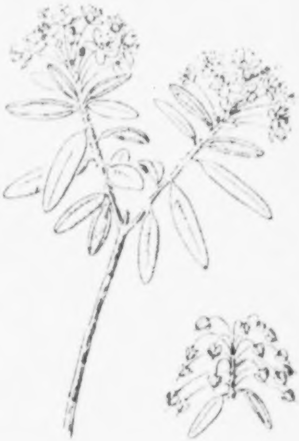
Notes: Both the generic and specific name with the same meaning, *Arctostaphylos*, in Greek, from *arctos*, a bear, and *staphyles*, a bunch of grapes (berries); the mealy, bland berries were cooked (to improve flavor) and eaten by Indians; as well, medicinal uses were numerous, used in cases of kidney and bladder ulceration, also known for its antiseptic properties on mucous membranes, and is reputed to have astringent properties; the name kinnikinnick actually refers to tobacco mixtures in which *A. uva-ursi* was a component; bearberry is an excellent ground cover species, both from an ornamental and environmental perspective, well suited to rather poor, shallow soils, and tolerant of both acidic and dry conditions; as with other such ground cover plants, both species areis of particular use in watershed protection, preventing erosion and also maximizing moisture absorption capacity of the soil.
Note: Two additional pink flowered species can be briefly mentioned: *Kalmia microphylla*, of southern boreal bogs/moist Rocky Mountain sites, has opposite oval evergreen leaves with rolled margins, white below; corolla open-bell-shaped, 5-12 mm. across; *Andromeda polifolia* (bog rosemary) is a boreal peat bog species with leaves alternate, narrow-elliptic, margins rolled, glaucous-white below; flowers similar to those of *A. ura-ursi*.

LEDUM L. - Labrador Tea

Common Characteristics

- Low growing, branched, rather resinous evergreen shrubs.
- Young twigs arising from base of flower clusters.
- Leaves alternate, entire and often with rolled margins, persistent, thick and firm, either rusty-hairy or with resinous scales below.
- Flowers in terminal umbel-like clusters, the parts in 5's, from large buds, the stalks drooping in fruit.
- Calyx divided to near base, very short, petals distinct, spreading.
- Ovary superior.
- Fruit a 5-valved capsule, opening from the base, releasing minute winged, elongate seeds.

Ledum groenlandicum Oeder - Common Labrador Tea



Growth Habit:	**Branched spreading-erect shrub to 1 m. tall**; twigs light brown, **rusty-hairy**, becoming grey, hairless in older branches.
Blades:	Leaves **oval-oblong, 1-5.5 cm. long, strongly rolled**, the top rounded-short-pointed; leaves **leathery, deep green, wrinkled, hairless or with a few rusty-hairs above**; lower surface and the short stalks **densely rusty-woolly**.
Inflorescence:	Flowers **in umbel-like clusters**, often rather numerous, on glandular, finely hairy stalks; petals **white, separate, spreading**, 5-9 mm. long; calyx divided to the base, **very short**, it and the bracts glandular-hairy; stamens **5-7; capsules egg-shaped, 4-7 mm. long, with the persistent style at the top**.
Habitat & Distribution:	Common in the foothills, montane and boreal forest regions. Found in swampy, wet coniferous wooded areas, in bogs (especially peat), commonly with *Picea mariana/Larix laricina*. Associated with acidic, infertile soils, and is an indicator of these ecosites.

Forage Value: Poor, nutrient content considered inferior, and plants unpalatable to livestock, utilized to some extent by game, especially deer, but only when other forage is scarce; as well, the habitats occupied by this and other associated species are often marginal rangelands and seldom used; *Ledum* species apparently have some toxic properties, containing resins that irritate nervous or muscle tissue.

Grazing Response: Increasers, although not overly aggressive.

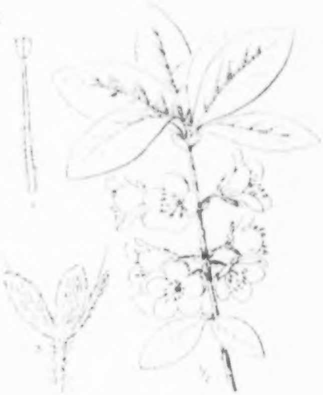
Notes: The generic name from the Greek *ledon* (matrix), a plant whose leaves resemble those of our species; *groenlandicum*, translates "of Greenland"; as the common name implies, the species has been widely used in teas which were taken as mild laxatives and for nervous disorders, also to treat fevers and rheumatism; *L. groenlandicum* is somewhat toxic to humans, the oils volatile, but teas of dried leaves still known to cause abortions; infusions were also used to treat skin problems, as an insect repellent, and to rid the body of lice and mites; *Ledum* species lend themselves well for use in wild gardens. *L. groenlandicum* also early successional on disturbances and burns in black spruce bogs; tolerance of acidic and infertile soils makes it useful for revegetating areas where many other plants would not survive.

RHODODENDRON L. - Rhododendron

Common Characteristics

- Shrubs, evergreen or deciduous.
- Leaves alternate, entire, short-stalked.
- Flowers 5-parted, large, showy.
- Flower lobes spreading, open-cup-shaped.
- Calyx 5-parted.
- Stamens 5-10, ovary 5-celled.
- Style conspicuously elongate.
- Fruit a 5-valved capsule, with minute, winged seeds.

Rhododendron albiflorum Hook. - White-flowered Rhododendron



Growth Habit: Deciduous shrubs **5-12 dm. tall; young branches with reddish-brown hairs**.

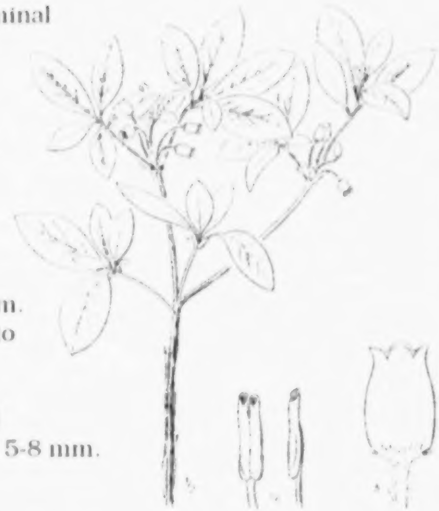
Blades: Thin, deep green above, paler below, **red-brown hairy when young**, nearly glabrous with age; **blades 2-6 cm. long, entire to wavy-margined**.

Inflorescence: **Flowers 5-parted**, 1-3 in axillary clusters along stem; pedicels **glandular and reddish hairy, sepals leaf-like, divided to near base**, to 1 cm. long, **glandular and with reddish hairs; flowers white, open-cup-shaped, about 2 cm. wide, the lobes spreading**; stamens 10, style elongate; capsules short-ovoid, glandular-hairy.

Similar Species:

1. ***Menziesia ferruginea*** J. E. Smith - Rusty Menziesia
   Plants with much the same distribution and found in similar habitats.
   Distinguished as follows:
   - Shrubs to 2.5 m. tall.
   - Young twigs glandular, malodorous, older twigs smooth, grey-brownish, peeling into thin layers.
   - Blades 3-6 cm. long, oblong-elliptic, short hairy to glabrous, pale below, the margins toothed with gland-tipped hairs.

- Flowers in terminal clusters, on glandular-hairy stalks.
- Calyx 4-lobed, small, glandular-hairy.
- Corolla urn-shaped, 4-lobed, 7-9 mm. long, greenish to bronze.
- Stamens 8.
- Fruit a 4-celled capsule, ovoid, 5-8 mm. long.



Habitat & Distribution: Most common in the Rocky Mountain region, with some occurrences in the southern boreal forest. Found in moist wooded places.

Forage Value: Poor; as with several other ericaceous shrubs, rhododendron contains the poisonous substance andromedotoxin; sheep are most often affected, but actual cases of poisoning are rare, both because plants are unpalatable and because they often occupy marginal rangeland; symptoms include digestive disruptions, nausea, pain, nasal discharge, difficulty breathing, and in fatal cases, coma precedes death; menziesia has similar toxic properties, but is also rarely consumed in any quantities.

Grazing Response: Increasers.

Notes: The generic name is from the Greek *rhodon*, rose, and *dendron*, tree; both the specific and common name refer to the attractive white flowers; rhododendrons are also toxic to humans, acting as a violent purgative, and even honey made from the flowers can cause adverse symptoms; rhododendrons are some of our most widely grown ornamentals, native species well adapted for use in moist, wooded places.

VACCINIUM L. - Blueberry; Huckleberry; Cranberry

Common Characteristics

- Shrubs, creeping to erect, evergreen or more often deciduous.
- Twigs without end buds, side buds with 2 scales meeting at edges.
- Leaves alternate, entire to toothed, thick to thin textured.
- Flowers 1-several (in racemes), axillary or terminal.
- Flower parts in 4's or 5's, the calyx with evident to nearly obsolete lobes, the corolla from globose/urn-shaped to more open, cup-shaped, the lobes very short to elongate.
- Stamens 8-10.
- Ovary inferior.
- Fruit a red to blue many-seeded, fleshy berry; berries edible.

Key to Vaccinium

1. Leaves evergreen, glossy, firm, revolute, with a few black hairs below; corolla cup-shaped, pink; fruit a red cranberry. *V. vitis-idaea*

Leaves deciduous, thin; black hairs on leaves absent, corolla more closed-urn-shaped; fruit red to purple or black. **2**

2. Leaves distinctly hairy, at least below; flowers rather numerous, in clusters. *V. myrtilloides*

Leaves glabrous to sparsely hairy; flowers single or 2-3 in clusters. **3**

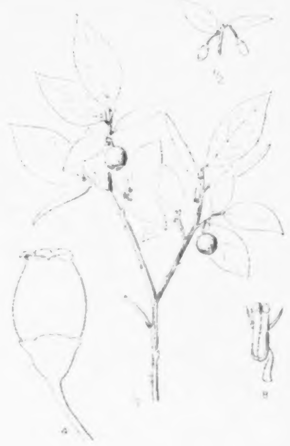
3. Young branches not sharply angled, brown to reddish; leaves oblanceolate-obovate, serrate, narrowed at the base. *V. caespitosum*

Young branches sharply angled, greenish; leaves ovate-lanceolate or elliptic. **4**

4. Branches slender, numerous, broomy; leaves about 8 mm. long; fruit red; small shrubs. *V. scoparium*

Branches not broomy; leaves 2-5 cm. long; fruit purple-black; large shrubs to 15 dm. tall. *V. membranaceum*

Vaccinium membranaceum Dougl. *ex* Hook. - Tall Bilberry; Huckleberry



Growth Habit: **Large deciduous shrub, 0.5-1.5 m. tall**, much branched-spreading; **branches distinctly angled**, the young twigs yellow-green, often hairy, becoming grey, glabrous, shredding with age; buds with 2 reddish scales.

Blades: **Leaves ovate or elliptic-oblong, 2-5 cm. long, acute or abruptly acuminate**; leaves mostly glabrous, paler below, the margins serrate.

Inflorescence: Flowers solitary in axils, glabrous, pedicels 5-10 mm. long; calyx short, with rounded, nearly obsolete teeth; **corolla 5-6 mm. long, yellowish-pink or purple-tinged, urn-shaped**, with short lobes; anthers awned; **berries purplish-black**, not glaucous, **7-10 mm. across**.

Habitat & Distribution: Frequent in the Rocky Mountain/southern boreal forest regions. A common understory species in mesic white spruce forests.

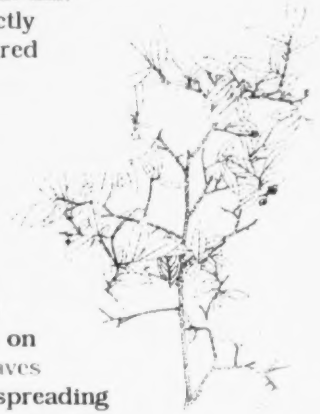
Forage Value: Poor for domestic livestock, sometimes consumed by sheep but utilization usually indicating a general shortage of palatable forage; tall bilberry rates as fair quality feed for game, sometimes prominent on elk winter range and is browsed rather heavily in some localities; unlike most members of the genus, it does supply appreciable amounts of forage; the fruit is valued as a food source for bears, birds and rodents.

Grazing Response: An increaser.

Notes: The specific name translates thin, alluding to the leaf texture; *V. membranaceum* rates much the same as both *Arctostaphylos* and other members of its genus in terms of traditional and medicinal uses, perhaps best known as an astringent; various mixtures were used to treat diarrhea and other bowel problems, and there is evidence that some species possess properties that improve eyesight and various herbal mixtures are currently available to treat a number of eye disorders; vacciniums are known to help diabetic and hypoglycemic conditions by supposedly lowering the need for insulin; *V. membranaceum* produces an abundance of fruit of exceptional flavor and still rates among our most prized wild berries; bilberry can be transplanted into shaded gardens in areas with good moisture, valued both as an ornamental and for its fruit. *Note:* Also frequent in some montane/subalpine forests is *V. myrtillus*, similar but much smaller: plants 1-3 dm. tall, oval leaves to 2 cm. long, fruit to 8 mm. wide.

Vaccinium myrtilloides Michx. - Blueberry

Growth Habit: **Low branching shrubs 1-4 dm. tall**; branches rounded, **not distinctly angled**, the young twigs **obscured by dense white, stiff hairs**, reddish-brown and nearly hairless with age; buds with reddish-brown, overlapping scales, nearly hairless, often hair-fringed.

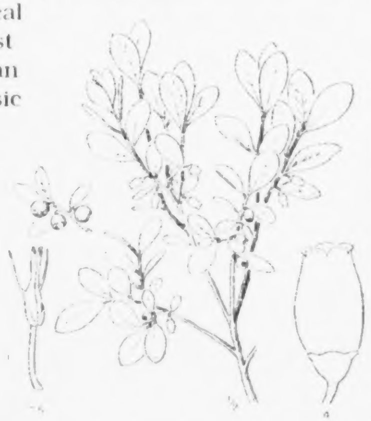


Blades: Leaves **oval-lanceolate, 1-4.5 cm. long**, wedge-shaped and pointed at the top, **entire, on short densely hairy stalks**; leaves **rather thin, softly hairy with spreading hairs, especially on veins and margins, more densely so below**, sometimes rather sparsely so above.

Inflorescence: Flowers **rather numerous, arranged in axillary racemes**, the main axis and stalks hairless; calyx finely hairy, the **lobes well developed, triangular**; corolla urn-shaped, **about 4 mm. long, greenish-white and usually purple-tinged**, more or less cylindrical; ovary inferior, **berries blue, glaucous, 5-8 mm. wide**.

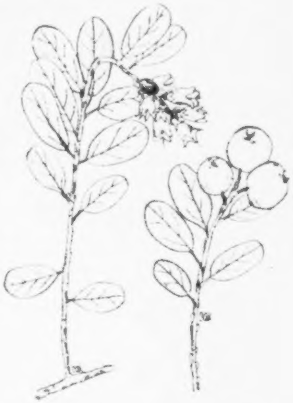
Similar Species:

1. *Vaccinium caespitosum* Michx. - Dwarf Bilberry
   Found in all Ecoregions except the prairies, also absent from some northern boreal regions. Frequent in moist coniferous woods, often an indicator of subxeric-mesic coniferous ecosites. Distinguished as follows:
   - Low growing deciduous shrubs 0.5-2.5 dm. tall.
   - Branches reclining, rooting, only obscurely angled, finely hairy when young, hairless at maturity.



- Leaves oblanceolate-obovate, 1-3 cm. long, toothed, at least above the middle.
- Leaves thin, glossy, veiny, hairless or with a few hairs and glands below.
- Flowers mostly solitary.
- Sepal lobes nearly obsolete.
- Flowers pink, to 5 mm. long.
- Fruit a pale blue berry.

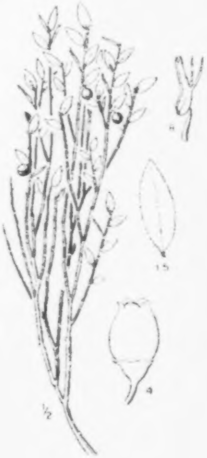
2. ***Vaccinium vitis-idaea*** L. ssp. ***minus*** (Lodd.) Hult. - Bog Cranberry



Common in the foothills, montane and boreal forest regions. Found in a wide range of moisture regimes: bogs and muskegs, sometimes in rather dry bogs and sandy places, in coniferous woods. Indicates moderate soil acidity. Distinguished as follows:

- Mat forming, trailing shrubs 1-2 dm. tall.
- Stems not angled, finely hairy when young.
- Leaves ovate-obovate, 0.5-1.5 cm. long, mostly entire, the margins rolled.
- Leaves evergreen, thick, dark green and glossy (hairless) above, paler and with scattered black hairs below.
- Flower parts in 4's.
- Corolla open-cup-shaped, pink, 5 mm. long.
- Fruit a glossy red berry, 5-9 mm. across.

3. ***Vaccinium scoparium*** Leiberg - Grouse-berry

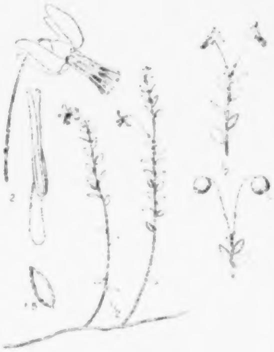


Confined to the Rocky Mountain region where a common component of montane and subalpine forests. Distinguished as follows:

- Small shrubs 1-2 dm. tall, branches often numerous, fine, "broomy".
- Blades ovate-lanceolate, 6-12 mm. long, acute, sharply toothed, veiny.
- Flowers pink, about 3 mm. long.
- Fruit red.

4. ***Oxycoccus microcarpus*** Turcz. - Small Bog Cranberry

One of two species of *Oxycoccus*, common in the boreal forest, occasional in northern portions of the foothills and montane regions. Grows in (usually sphagnum) bogs and is an indicator of nutrient-deficient, poorly drained sites.



Distinguished as follows:

- Very slender trailing plants with rooting stems 1-5 dm. long.
- Plants mostly hairless (stems finely hairy when young).
- Leaves ovate, 2-6 mm. long, to 2 mm. wide, rather widely spaced.
- Leaves evergreen, firm, the margins strongly rolled, dark green above, glaucous below.
- Flowers in groups of 1-3, on reddish stalks (these with a pair of bracts below the middle) 1-4 cm. long.
- Flowers pink, the 4 petals divided to near the base, the lobes curved, 5-7 mm. long.
- Fruit a small (to 10 mm. across) red berry.

Habitat & Distribution: Common in the boreal forest. Grows in sandy woods, especially in jack pine forests, in bogs, moist woods, in open woods and clearings. A prolific berry-producing species.

Forage Value: Poor, the genus as a whole with low palatability, seldom used by livestock, occasionally browsed by game when food is in short supply; some species (*V. myrtilloides* for one) are often major components of some woodlands and as such do provide some forage; on the other hand, many occupy marginal areas less often used by game and livestock; all *Vaccinium* as well as *Oxycoccus* species are an important source of food for bears, small mammals and birds.

Grazing Response: Increasers.

Notes: *Vaccinium*, the Latin name from *vacca*, cow, referring to some shrubby species browsed by cattle; the specific name given because the leaves resemble those of myrtle; also known as Canada or velvet-leaved blueberry; berries of all species are very tasty, and were a valuable part of the diet of native people, the fruit eaten fresh or dried for later use; medicinal properties resemble those of *Arctostaphylos uva-ursi*, but were generally considered less potent; all species provide valuable ground cover in areas where vegetation is often sparse, *V. myrtilloides* useful in stabilizing sandy soil in northern regions, other species important for their shade and acid tolerance; propagation can be accomplished by seed, or by stem or root cuttings.

CAPRIFOLIACEAE - Honeysuckle Family

Common Characteristics

- Shrubs or creeping subshrubs, often with shredding bark.
- Leaves exstipulate, opposite, mostly deciduous, evergreen in *Linnaea*.
- Flowers perfect.
- Calyx 3-5 lobed, corolla 5-lobed, often also 2-lipped, tubular to saucer-shaped.
- Stamens normally 5 (4 in *Linnaea*).
- Ovary inferior.
- Fruit varying from a fleshy 1-several seeded berry or drupe to a dry, 1-seeded capsule.

Key to Caprifoliaceae

1. Leaves pinnate. *Sambucus*

Leaves simple. **2**

2. Slender, trailing, rooting woodland plants; flowers pink, nodding, in 2's. *Linnaea*

Taller shrubs. **3**

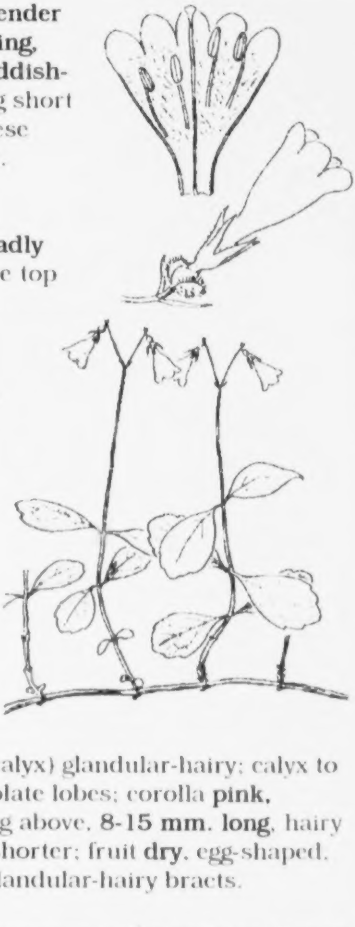
3. Leaves shallow to deeply lobed, also toothed. *Viburnum*

Leaves entire to wavy-shallow toothed. **4**

4. Flowers bell-shaped, mostly regular, in clusters; fruit white to purplish. *Symphoricarpos*

Flowers more funnel or tube-shaped, usually irregular, mostly in pairs, fruit red, yellow or black. *Lonicera*

Linnaea borealis L. ssp. *americanum* (Forbes) Hult. - Twin-flower



Growth Habit: **Low growing plants**, stems **slender but woody, creeping and rooting, mat forming, to 1 m. long, reddish-brown, finely hairy**, producing short leafy stems to 10 cm. long, these each with a single flower stalk.

Blades: Leaves narrowed to short but evident stalks, the blades **broadly oval-obovate, 1-2 cm. long**, the top acutish, the **margins, at least above the middle, shallow-toothed**; blades **firm, persistent, dark green above, paler below, hairless except for a few long, spreading, marginal hairs**, these more abundant toward base and on stalks.

Inflorescence: Main flower stalks **to 10 cm. tall, forking near the top into 2 nodding flower stalks**, marked at the top with two small bracts; inflorescence (stalks, bracts, small bracts, calyx) glandular-hairy; calyx to 5 mm. long, with linear-lanceolate lobes; corolla **pink, 5-lobed, funnel-shaped**, flaring above, **8-15 mm. long**, hairy internally; stamens 4, with 2 shorter; fruit **dry**, egg-shaped, 1-seeded, enclosed by small glandular-hairy bracts.

Habitat & Distribution: Common in most regions, uncommon in the prairies. Grows in moist woodlands, often forming large mats and growing over moss-covered decaying trees.

Forage Value: Poor, providing little forage and also unpalatable, but as with other small woodland species, it will be utilized in the absence of better quality forage.

Grazing Response: An increaser, but not considered aggressive.

Notes: Named in honor of Carolus Linnaeus, *borealis* a reference to its northern range; twin-flower, because the flowers usually occur in pairs; *L. borealis*, although small, has exceptional ornamental value, and with its adaptation to shade and acidic soils, is an important species in providing ground cover in forested areas; plants are probably most easily propagated by stem or root cuttings.

LONICERA L. - Honeysuckle

Common Characteristics

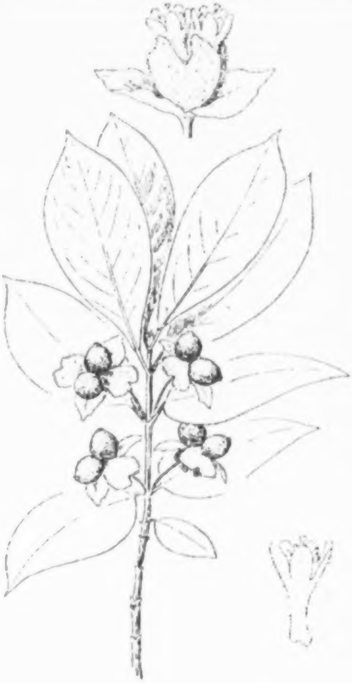
- Deciduous shrubs or woody vines, the bark often shredding.
- Leaves opposite, exstipulate, simple, mostly entire.
- Flowers regular to irregular, in axillary or terminal pairs or small clusters.
- Calyx with 5 short lobes, the corolla funnel-shaped to tubular, 5-lobed but often irregular and swollen at one side of the base.
- Stamens 5.
- Fruit a small, several-seeded berry.

Key to Lonicera

1. Stems reclining/climbing; upper leaves joined (connate); flowers red-yellow, in terminal clusters; fruit red. *L. dioica*

Stems erect; leaves not connate; flowers in pairs, with large leafy bracts, these red-purple at maturity; flowers yellow, red-tinged; fruit purple-black. *L. involucrata*

Lonicera involucrata (Richards.) Banks - Bracted Honeysuckle



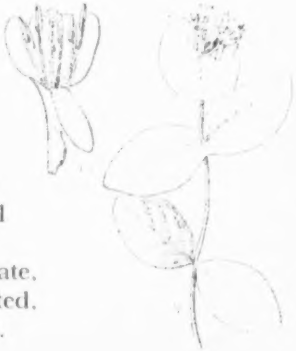
Growth Habit: Erect shrubs **1-4 m. tall, the twigs 4-sided, angled**, yellowish-brown, finely hairy only on newest growth, with rings at the nodes; older branches grey-brown, shredded.

Blades: Leaves **ovate-obovate, 5-14 cm. long**, short-stalked, pointed; leaves **white-coarse-hairy and glandular, often on both surfaces**, hairs sometimes restricted to veins and margins.

Inflorescence: Flowers **in axillary pairs**, on well developed stalks and **subtended by 4 large bracts, these separate or united into pairs**; bracts green and glandular, erect, **becoming red-purple and reflexed in fruit**; corolla **nearly regular, yellow and often red-tinged, glandular-hairy, 10-15 mm. long**, with a short basal spur; berries **not joined, purple-black, 8-10 mm. across**.

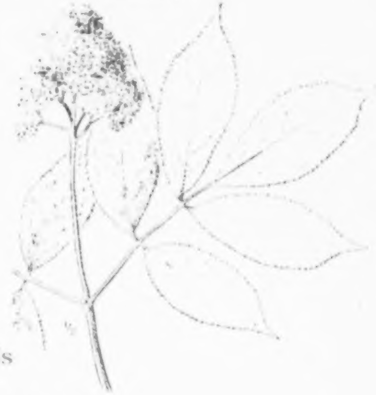
Similar Species:

1. ***Lonicera dioica*** L. var. ***glaucescens*** (Rydb.) Butters - Twining Honeysuckle
   Common throughout most regions, less frequent in the prairies. Found in open woods and thickets, on damp, often rocky hillsides. Distinguished as follows:
   - Twigs reclining-twining and climbing, sometimes several metres long.
   - Leaves broadly oval to obovate, 5-8 cm. long, the upper united, entire, often wavy-margined.



- Leaves hairless above, pale-glaucous and finely hairy below.
- Flowers showy, in terminal clusters, yellow, reddish-tinged, 1.5-2.5 cm. long.
- Flowers irregular (2-lobed, swollen at one side at the base), hairy inside.
- Fruit a red berry.

2. ***Sambucus racemosa*** L. - Elderberry



Frequent in the foothills, montane and southern boreal forest regions. Found in moist woods and thickets, in clearings, along streams. Distinguished as follows:

- Shrubs to 3 m. tall, plants with a strong odor.
- Twigs stout, the buds large, in pairs.
- Pith to 3/4 stem diameter.
- Leaves pinnate, with 5-7 lanceolate-oval leaflets to 17 cm. long.
- Leaflets toothed, dark green, often finely glandular above, pale-finely hairy below.
- Flowers in round-topped clusters.
- Flowers numerous, small (3-6 mm. wide), white.
- Fruit a red, small (5-6 mm. across) spherical berry.

Habitat & Distribution: Very common in the foothills, montane and southern boreal forest regions. Grows in moist woods and thickets, in boggy woods, on rocky wooded slopes. Often an indicator of deciduous and mixedwood forests with favorable moisture and soil nutrients, and associated with ferns in some foothills ecosites.

Forage Value: Poor, honeysuckle species occasionally used by sheep and game, less frequently so by cattle; elderberry rates much the same during the growing season, but palatability appears to improve considerably after frost, with utilization increasing significantly; the fruits of various species are readily eaten by birds.

Grazing Response: Increasers (both honeysuckles and elderberry) but not invasive.

Notes: Named after Adam Lonitzer (1528-86) a German botanist; *involucrata*, a reference to the conspicuous involucre; also known as black twin-berry, fly honeysuckle; members of the honeysuckle family were variously used by native people; berries of *L. involucrata* were eaten, although this is not advised due to their toxic properties, and the leaves taken to cause vomiting after poisoning; fresh-peeled honeysuckle bark has an effect on cats much like that of catnip, handy for making homemade cat toys, also now commercially available in pet stores; elderberries were also eaten, although the seeds are mildly toxic and unless removed, cause nausea; inner bark teas were used to treat epilepsy, eye problems, and for cleansing and purgative purposes; foliage was applied as poultices on wounds and bruises, and used for skin problems and as a general cosmetic; the hollow branches were sometimes made into simple flutes; both honeysuckles and elderberries make attractive ornamentals, also are important in providing vegetation cover, often naturally moving onto cut-over areas and disturbances in wooded regions.

SYMPHORICARPOS Duhamel - Snowberry; Buckbrush

Common Characteristics

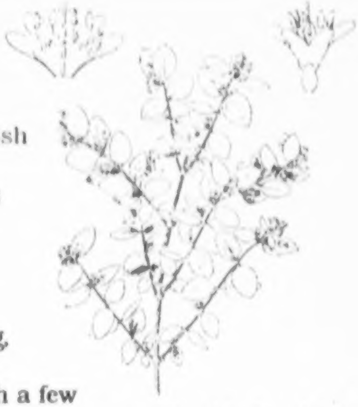
- Low shrubs, much branched and spreading-erect.
- Stems and branches with shredding bark, hollow.
- Leaf scars raised, often torn.
- Leaves simple, entire or wavy-margined, short stalked.
- Flowers regular, bell-shaped to funnel-shaped, pink to whitish, in short axillary or terminal clusters.
- Flower parts in 4's or 5's, the corolla hairy within.
- Stamens 4-5.
- Fruit a 2-seeded berry-like drupe, white to somewhat greenish-black darkened.

Key to Symphoricarpos

1. Flowers short-stalked, with styles 2-3 mm. long, glabrous, not exserted; stamens not exserted. *S. albus*

Flowers sessile, with styles 4-8 mm. long, hairy, exserted; stamens exserted. *S. occidentalis*

Symphoricarpos occidentalis Hook. - Buckbrush; Wolfberry



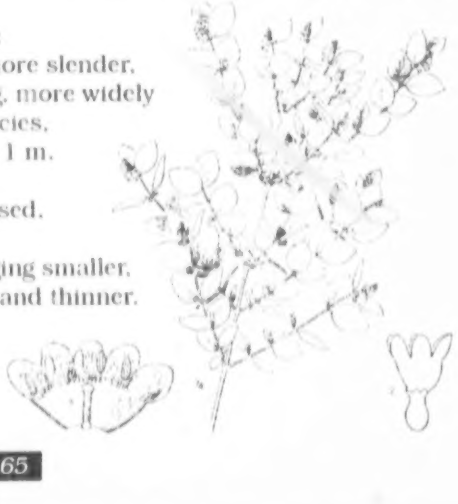
Growth Habit: **Branching shrubs to 1 m. tall**, erect-ascending, spreading and **forming colonies from extensive rhizomes**; young twigs brownish or reddish, finely white hairy, **becoming grey and shredded; pith hollow**; buds small, pointed, with a pair of finely hairy reddish-brown scales.

Blades: Leaves **oval or broadly oblong, 3-5 cm. long, entire or wavy-margined** and **sometimes with a few irregular teeth** (more prevalent on new growth); blades thick and firm at maturity, **green and hairless above, and paler, often finely glandular-hairy below**.

Inflorescence: Flowers rather few to many in upper axils and terminal clusters; corolla **regular, pink, bell-shaped**, the **lobes 3-4 mm. long, spreading**; anthers 1.5-2 mm. long, distinctly shorter than filaments, the **stamens exserted**; styles **hairy, 4-8 mm. long, exserted**; fruit berry-like, **whitish, often darkening to greenish-black**.

Similar Species:

1. ***Symphoricarpos albus*** (L.) Blake - Snowberry
   Also distributed throughout most regions, although generally less abundant. Grows in open woods, thickets, on open slopes.
   Differs as follows:
   - Generally a more slender, lower growing, more widely branched species, sometimes to 1 m. tall.
   - Leaf scars raised, often torn.
   - Leaves averaging smaller, 2-4 cm. long, and thinner.
   - Flowers usually rather few per cluster.



- Corolla lobes smaller, 2-3 mm. long, and less spreading, shorter than the tube.
- Anthers 1-1.5 mm. long, not much shorter than filaments, not exserted.
- Styles hairless, 2-3 mm. long, not exserted.

Habitat & Distribution: Very common throughout. Found in open woods and thickets, forming large colonies in grassland. In the prairie region, it is restricted to deeper, sometimes sandy soils, and those areas with better moisture (along creeks, on shrubby coulee slopes, in depressional grassland).

Forage Value: Poor; actual nutrient levels are fairly good in spring and summer, but quality drops by fall; palatability of *Symphoricarpos* species is poor for game and livestock, but this varies significantly from one locality to the next, primarily dependent upon associated vegetation and abundance of better forage.

Grazing Response: Increasers; *S. albus*, moderately aggressive, is apparently a non-suckering species; *S. occidentalis*, on the other hand, is very invasive, increasing by both vegetative means and seed, and capable of forming extensive thickets in native grassland and greatly reducing carrying capacities over time; a combination of mowing, chemical application and good management practices is required to keep the species in check.

Notes: From the Greek *syn*, together, *phorein*, to bear, and *karpos*, fruit, alluding to the clustered berries; the specific name means "of the west"; also known as western snowberry; roots and stems of *S. albus* (and probably also *S. occidentalis*) were taken by Indians to treat stomach problems and morning sickness, leaves and fruit were used as poultices for burns and wounds, and twig infusions used to treat "female problems"; berries were an emergency food supply, also used as a diuretic, both for human use and believed to alleviate water retention in horses; arrows were sometimes made from twigs, and the shrubby growth used to make brooms; from an aesthetic perspective, both *Symphoricarpos* species are attractive, and both are important in providing cover and preventing erosion, *S. albus* with higher moisture requirements and more suited to acidic soils, *S. occidentalis* with moderate salt tolerance, and known to withstand considerable drought; any use of the latter species, however, must be restricted to areas where its aggressiveness can be controlled, thus less invasive alternatives are recommended on disturbances in native rangelands.

VIBURNUM L. - Bush Cranberry

Common Characteristics

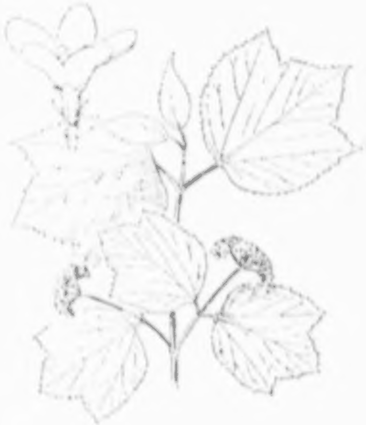
- Shrubs or small trees, often strong-scented.
- Winter buds with 2 red, united outer scales, these hairless, pointed.
- Leaves stalked, with or without stipules, simple but lobed and again toothed.
- Flowers perfect, regular, or sometimes neutral and irregular, in umbel-like cymes.
- Calyx, corolla lobes and stamens each 5.
- Corolla bell-shaped to saucer-shaped, mostly white.
- Fruit a red, fleshy drupe with 1 hard, flattened stone, strong-scented but edible.

Key to Viburnum

1. Leaves mostly deeply 3-lobed; inflorescence branch with 2 pair of leaves; outer flowers in cluster larger and sterile. *V. opulus*

Leaves mostly not deeply 3-lobed (divided less than ½ way to midrib); inflorescence branch with one pair of leaves; flowers all similar. *V. edule*

Viburnum edule (Michx.) Raf. - Low Bush Cranberry; Mooseberry



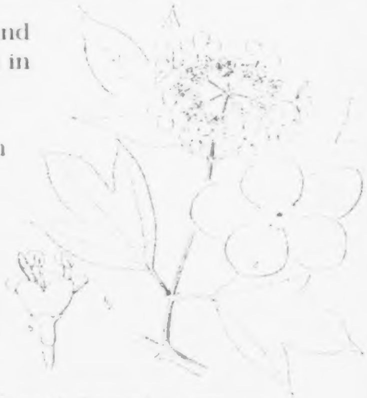
Growth Habit: Spreading to erect, much branched **shrub 1-2 m. tall**; twigs red-brown to pale grey, hairless, with rings at the nodes; older bark grey, smooth; pith thick, whitish; buds **opposite**, stalked, oval, covered by **2 hairless red, united**, outer **scales**.

Blades: Leaves exstipulate, **circular to obovate in outline, 4-10 cm. long, often 3-lobed (lobes shallow, less than ½ way to midrib)** and **again toothed**, pointed; blades **mostly hairless above, paler and often with brownish hairs in vein axils**, also often with a pair of glands at the junction of blade and stalk, and sometimes glandular on stalks, flower stalks and leaf veins beneath.

Inflorescence: Cymes rather few-flowered (5-30), **1-3 cm. wide**, on axillary shoots having a single pair of leaves; flowers **white, 5-lobed, all the same, regular and perfect, small, the corolla 4-7 mm. across**; fruit **red, 8-12 mm. across, juicy, acid, strongly malodorous but edible**.

Similar Species:

1. ***Viburnum opulus*** L. ssp. ***trilobum*** (Marsh) Clausen - High Bush Cranberry
   Locally abundant but found in relatively few locations in the parkland and boreal forest. Grows in moist woods and thickets, often in river valleys.
   Differs as follows:
   - Taller, more erect species, sometimes tree-like, 1-4 m. tall.
   - Leaves with narrow, gland-tipped stipules.
   - Leaves deeply 3-lobed, with fewer but coarse, spreading teeth.
   - Cymes on short branches with 2 pair of leaves.
   - Cymes larger (5-15 cm. wide), with more numerous flowers, flat-topped; flowers of 2 types, the central small, regular, fertile, the outer ring of neutral, somewhat irregular, larger flowers 1.5-2.5 cm. across.
   - Fruit and foliage strongly-scented but not as strongly so as *V. edule*.



Habitat & Distribution: Common in all areas except the prairies. Grows in moist woods, wet thickets, frequently an indicator of mesic-subhygric productive mixedwood ecosites.

Forage Value: Fair, both species of little use to livestock but browsed quite readily by game, primarily in the winter months; the fruit is a valuable source of food for a number of bird species.

Grazing Response: Increasers, but neither species invasive.

Notes: *Viburnum*, from *vieo*, to tie, apparently because of the pliable branches of the European species, *V. lanata*; *edule*, a reference to the edible fruit, which although rather strong and tart, was a source of food for native people; the bark is known for its ability to prevent cramps and spasms, useful for asthma and uterine cramps; teas made from berries were taken for mumps and swollen glands; both *Viburnum* species are highly ornamental, especially spectacular in autumn with their brightly colored foliage and fruit; plants can be started from stem or root cuttings, also by seed, although the hard seed coat and probable germ dormancy make establishment slow.

COMPOSITAE - Composite Family

Common Characteristics

A large and diverse family, with a complex and widely varying floral structure. Characteristics common to most members of the family can be summarized as follows:

- Flower heads composed of many small flowers on a common receptacle, below which is an involucre of bracts (true calyx absent).
- Chaffy bracts often present on receptacle and among florets.
- Individual flowers varying: perfect to unisexual, regular to irregular.
- Stamens 5, the anthers united into a tube (separate in one small group), stamens alternating corolla lobes.
- Ovary inferior.
- Fruit an achene, this sometimes unappendaged but more often with a scaly or hairy pappus attached to the top (considered a modified calyx).
- Achenes in some species enclosed in an involucre, this bur-like.
- Flowers of two types:

1. Tubular or disc flowers, these small, with a regular, 5-lobed corolla.
2. Ligulate or ray flowers, these usually more showy, irregular, with a single strap or ray, this sometimes toothed.

- Flower heads of 3 main types:

1. Flowers all ligulate.
2. Flowers radiate, with tubular flowers central and ray florets around the margin.
3. Flowers discoid, of tubular flowers only.

ARTEMISIA L. - Wormwood; Sagebrush

Common Characteristics

- Perennial herbs or shrubs, roots various.
- Foliage characteristically aromatic in most species.
- Leaves alternate, entire to dissected.
- Flowers small, all tubular.
- Involucre of dry, pale (at least partially) overlapping bracts; receptacle long hairy in some species.
- Achenes mostly hairless, pappus obsolete.

Key to Artemisia

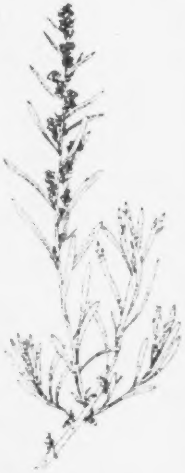
1. Plants shrubby, stems woody at least at base; flowers all alike. *A. cana*

Plants not woody at base of stems; central flowers mostly perfect, the marginal female. 2

2. Leaves green above, densely white-hairy below, the margins rolled; involucre white-hairy. *A. longifolia*

Leaves and involucres essentially green and nearly glabrous. *A. dracunculus*

Artemisia cana Pursh - Sagebrush



Growth Habit: Erect but **branched** and **often gnarled shrub 3-15 dm. tall**, from a deep taproot; **young twigs densely silvery-white hairy, felty; older stems with mostly hairless**, grey **often gnarled-twisted stems and branches**; buds naked, consisting of 2-3 small leaves in axils.

Blades: Leaves **linear-lanceolate, entire**, or rarely with 1-2 small teeth, **1-4 cm. long, pointed**; blades **silvery-short grey-hairy on both surfaces**, sometimes persisting over winter; foliage **with the characteristic sage odor**.

Inflorescence: Heads in small glomerules in a narrow, leafy panicle; bracts 3-5 mm. high, **short grey-hairy**; flowers discoid, yellow, the receptacle hairless, achenes glandular; pappus absent.

Similar Species:

1. ***Artemisia dracunculus*** L. - Dragonwort; Linear-leaved Wormwood
   Occasional, distributed throughout most regions. Found on open, dry slopes, on eroded banks, in dry prairie grassland. Distinguished as follows:
   - Plants not woody, but superficially resembling woody species.
   - Stems 5-10 (15) dm. tall, often reddish, striped, often hairy but never densely so.
   - Blades narrow, sometimes cleft, 2-8 cm. long.

- Blades hairless or sparsely hairy, green, pitted, often nearly odorless.
- Involucre green, sometimes sparsely hairy.

2. ***Artemisia longifolia*** Nutt. - Long-leaved Sage
   More restricted in its range to the prairie and parkland regions. Found in dry open places: on eroded slopes, in badlands, on alkaline or saline flats.
   Differs from *A. dracunculus:*
   - Stems densely white-hairy.
   - Leaves green above but densely white-hairy below.
   - Leaves narrow, pointed, entire or lowest somewhat toothed.
   - Leaf margins strongly rolled.
   - Involucre white-hairy.

Habitat & Distribution: Common in the prairie and parkland regions. Grows in dry prairie grassland, on dry, often eroded slopes and hillsides; prefers light, well-drained soils.

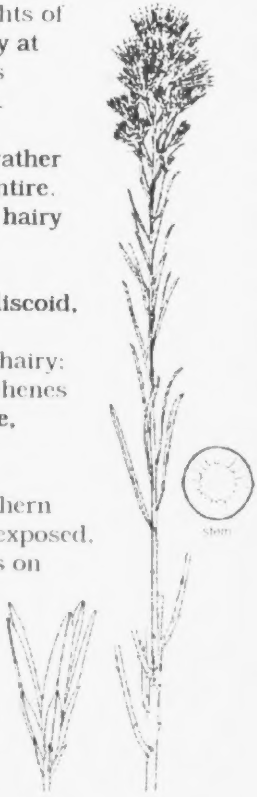
Forage Value: Fair, nutritionally similar to fringed sage (as much as 10% protein level retained by fall), but seldom eaten by cattle except in the absence of other forage, occasionally used by sheep, and relied upon heavily by antelope as a major component of their winter diet.

Grazing Response: An increaser with heavy livestock use, but stands can decline with extensive browsing pressure in areas where antelope concentrate.

Notes: Also called silver sagebrush; *A. cana* has received recognition as a medicinal plant similar to that of *A. frigida*, mixtures used to treat headaches, stomach trouble and colds, also to rid the body of worms; as well, it was supposedly used by the Blackfoot people to relieve thirst, and tonics were taken and believed to reverse hair loss; its nutritional value was apparently recognized, as it was considered good fall and winter feed for horses; sagebrush is valuable in erosion control on steep, often sparsely vegetated slopes; both *A. dracunculus* and *A. longifolia*, more often confined to erodable slopes and banks, are especially well suited for these purposes; all three species are tolerant of at least moderately alkaline soils.

CHRYSOTHAMNUS Nutt. - Rabbit-brush

Chrysothamnus nauseosus (Pall.) Britt. - Rabbit-brush



Growth Habit: **Low to medium shrubs**, reaching heights of **2-6 dm.**; plants **sometimes only woody at the base, much branched**; young twigs **densely covered with white felty hairs**.

Blades: Leaves alternate, **linear-very slender, rather numerous**, essentially **stalkless and entire**, erect, **1-5 cm. long**; leaves **grey-green, hairy to nearly hairless with age**.

Inflorescence: Heads in terminal rounded racemes, **discoid, usually 5-flowered**; bracts in several vertically arranged rows, pale, keeled, hairy; flowers **pale yellow, 6-10 mm. long**; achenes slender, 5 mm. long, hairy; pappus **fine, hair-like**, dull white.

Habitat & Distribution: Found in the prairies, confined to southern regions. Grows in dry, open areas: on exposed, eroded slopes, in badlands, sometimes on saline clay flats.

Forage Value: Poor, under normal conditions avoided by both livestock and game, but the new growth and flowers sometimes utilized when other forage is scarce, also during fall and winter; rabbit-brush is somewhat poisonous, but is seldom used extensively enough to cause symptoms.

Grazing Response: An increaser; the tough woody crowns are resistant to heavy trampling, and the species' superior adaptation to dry, exposed sites allows it to invade when drought or heavy grazing reduces the vigor of associated vegetation.

Notes: The generic name means golden-flowered and the specific *nauseosus* refers to the strong plant odor; also known as rubber rabbit-brush, from the rubber (chrysil) content of the species; *C. nauseosus* was once considered an important source of fall and winter horse feed by native people; it is a valuable species for stabilizing steep, erodable slopes, tolerant of very dry and moderately saline and alkaline conditions.

Index

A

- Abies
  - balsamea 27
  - lasiocarpa 27
- Acer
  - glabrum 130
  - negundo 130
- Alder
  - Green 80
  - River 81
- Alnus
  - crispa
    - ssp. crispa 80
    - ssp. sinuata 80
  - tenuifolia 81
- Alpine Fir 27
- Alpine Larch 22
- Amelanchier
  - alnifolia 103
- Andromeda
  - polifolia 148
- Arctic Willow 63
- Arctostaphylos
  - rubra 147
  - uva-ursi 147
- Artemisia
  - cana 171
  - dracunculus 170
  - longifolia 171
- Ash
  - Western Mountain 124
- Aspen 39
- Aspen Poplar 39
- Atriplex
  - canescens
    - var. aperta 88
  - nuttallii 88
  - Nuttall's 88
- Autumn Willow 77

B

- Ball Cactus 135
- Balsam Fir 27
- Balsam Poplar 36
- Balsam Willow 71
- Barratt Willow 52
- Basket Willow 73
- Beaked Hazelnut 80
- Beaked Willow 54
- Bearberry 147
- Berberis
  - repens 93
- Berry
  - Salmon 120
- Betula
  - glandulosa 85
  - occidentalis
    - var. occidentalis 84
  - papyrifera
    - var. papyrifera 84
  - pumila
    - var. glandulifera 85
- Bilberry
  - Dwarf 156
  - Tall 154
- Birch
  - Bog 85
  - Dwarf 85
  - Paper 84
  - Scrub 85
  - Water 84
  - White 84
- Black Cottonwood 36
- Black Currant
  - Bristly 100
  - Wild 95
- Black Spruce 26
- Blueberry 156
- Blueberry Willow 68
- Bog Birch 85
- Bog Cranberry 157
  - Small 158
- Bog Rosemary 148
- Bog Willow 70
- Bracted Honeysuckle 162
- Bramble 122
- Bristly Black Currant 100
- Brittle Prickly Pear 135
- Brush
  - Deer 132
  - Snow 132
- Buckbrush 165
- Buckthorn 133
- Buffalo-berry
  - Canadian 141
  - Thorny 141
- Bush Cranberry
  - High 168
  - Low 167

C

Cactus
  Ball 135
  Cushion 135
Canadian Buffalo-berry 141
Ceanothus
  velutinus 132
Cherry
  Choke 111
  Pin 112
Choke Cherry 111
Chrysothamnus
  nauseosus 172
Cinquefoil
  Shrubby 109
Cloudberry 122
Common Labrador Tea 149
Common Wild Rose 116
Cornus
  stolonifera 144
Corylus
  cornuta 80
Coryphantha
  vivipara 135
Cottonwood
  Black 36
  Narrow-leaf 37
  Western 36
Cranberry
  Bog 157
  High Bush 168
  Low Bush 167
  Small Bog 158
Crataegus
  douglasii 104
  rotundifolia 104
Creeping Juniper 18
Creeping Mahonia 93
Currant
  Bristly Black 100
  Golden 98
  Skunk 96
  Wild Black 95
  Wild Red 96
Cushion Cactus 135

D

Deer Brush 132
Devil's-club 143
Dewberry 120
Diamond Willow 74
Dogwood
  Red Osier 144
Douglas Fir 33
Dragonwort 170
Drummond Willow 57
Dryad
  White 107, 108
  Yellow 107
Dryas
  drummondii 107
  integrifolia 108
  octopetala
    spp. hookeriana 107
Dwarf Bilberry 156
Dwarf Birch 85
Dwarf Raspberry 119

E

Elaeagnus
  commutata 138
Elderberry 163
Engelmann Spruce 26
Eurotia
  lanata 90

F

Fir
  Alpine 27
  Balsam 27
  Douglas 33
Five-leaved Bramble 122
Flat-leaved Willow 73

G

Golden Currant 98
Gooseberry
  Wild 100
Greasewood 92
Green Alder 80
Ground Juniper 19

H

Hawthorn 104
  Round-leaved 104
Hazelnut
  Beaked 80
High Bush Cranberry 168
Hoary Willow 55
Honeysuckle
  Bracted 162
  Twining 162
Huckleberry 154

J

Jack Pine 30
Juniper
  Creeping 18
  Ground 19
  Rocky Mountain 18
Juniperus
  communis 19
  horizontalis 18
  scopulorum 18

K
Kalmia
  microphylla 148
Kinnikinnick 147

L
Labrador Tea
  Common 149
Larch
  Alpine 22
Larix
  laricina 21
  lyallii 22
Ledum
  groenlandicum 149
Limber Pine 31
Linear-leaved Wormwood 170
Linnaea
  borealis
    ssp. americanum 160
Lodgepole Pine 30
Long-leaved Sage 171
Lonicera
  dioica
    var. glaucescens 162
  involucrata 162
Low Bush Cranberry 167

M
Mahonia
  Creeping 93
Manitoba Maple 130
Maple
  Manitoba 130
  Mountain 130
Meadowsweet
  Narrow-leaved 127
  White 127
Menziesia
  ferruginea 151
  Rusty 151
Mooseberry 167
Mountain Ash
  Western 124
Mountain Lover 131
Mountain Maple 130
Mountain Willow 65
Myrtle-leaved Willow 68

N
Narrow-leaf Cottonwood 37
Narrow-leaved Meadowsweet 127
Nuttall's Atriplex 88

O
Oplopanax
  horridum 143
Opuntia
  fragilis 135
  polyacantha 135
Oxycoccus
  microcarpus 158

P
Pachistima
  myrsinites 131
Paper Birch 84
Peach-leaved Willow 50
Pear
  Brittle Prickly 135
  Prickly 135
Picea
  engelmannii 26
  glauca 25
    var. albertina 25
    var. porsildii 25
  mariana 26
Pin Cherry 112
Pine
  Jack 30
  Limber 31
  Lodgepole 30
Pinus
  banksiana 30
  contorta
    var. latifolia 30
  flexilis 31
Poison Ivy 98
Poplar
  Aspen 39
  Balsam 36
Populus
  angustifolia 37
  balsamifera
    ssp. balsamifera 36
    ssp. trichocarpa 36
  deltoides
    var. occidentalis 36
  tremuloides 39
Potentilla
  fruticosa 109
Prairie Rose 115
Prickly Pear 135
  Brittle 135
Prickly Rose 115
Prunus
  pensylvanica 112
  virginiana 111
Pseudotsuga
  menziesii 33

R

- Rabbit-brush 172
- Raspberry
  - Dwarf 119
  - Running 120
  - Wild Red 119
- Red Currant
  - Wild 96
- Red Osier Dogwood 144
- Red Raspberry
  - Wild 119
- Rhamnus
  - alnifolia 133
- Rhododendron
  - albiflorum 151
  - White-flowered 151
- Rhus
  - radicans 98
  - trilobata 98
- Ribes
  - americanum 95
  - aureum 98
  - glandulosum 96
  - hudsonianum 95
  - lacustre 100
  - oxyacanthoides 100
  - triste 96
- River Alder 81
- Rosa
  - acicularis
    - ssp. sayi 115
  - arkansana 115
  - woodsii 116
- Rose
  - Common Wild 116
  - Prairie 115
  - Prickly 115
- Rosemary
  - Bog 148
- Round-leaved Hawthorn 104
- Rubus
  - arcticus
    - ssp. acaulis 119
  - chamaemorus 122
  - idaeus
    - ssp. melanolasius 119
  - parviflorus 120
  - pedatus 122
  - pubescens 120
- Running Raspberry 120
- Rusty Menziesia 151

S

- Sage
  - Long-leaved 171
  - Salt 88
- Sagebrush 170, 171
- Salix
  - amygdaloides 50
  - arbusculoides 62
  - arctica 63
  - barrattiana 52
  - bebbiana 54
  - brachycarpa 62
  - candida 55
  - discolor 74
  - drummondiana 57
  - exigua 59
  - farriae 70
  - glauca
    - var. villosa 61
  - lucida
    - ssp. caudata 64
    - ssp. lasiandra 64
  - lutea 65
  - maccalliana 67
  - melanopsis 60
  - myrtillifolia
    - var. cordata 68
    - var. myrtillifolia 68
  - pedicellaris 70
  - petiolaris 73
  - planifolia
    - ssp. planifolia 73
  - pseudomonticola 65
  - pyrifolia 71
  - scouleriana 75
  - serissima 77
  - vestita 78
- Salmon Berry 120
- Salt Sage 88
- Saltbush 88
- Sambucus
  - racemosa 163
- Sand Willow 59
- Sarcobatus
  - vermiculatus 92
- Saskatoon 103
- Scouler's Willow 75
- Scrub Birch 85
- Shepherdia
  - argentea 141
  - canadensis 141
- Shining Willow 64
- Short-capsuled Willow 62
- Shrubby Cinquefoil 109
- Shrubby Willow 62
- Silver-berry 138
- Skunk Currant 96
- Skunk-bush 98

Small Bog Cranberry 158
Smooth Willow 61
Snow Brush 132
Snowberry 165
Sorbus
  scopulina 124
Spiraea
  alba 127
  betulifolia 127
Spruce
  Black 26
  Engelmann 26
  White 25
Symphoricarpos
  albus 165
  occidentalis 165

T

Tall Bilberry 154
Tamarack 21
Tea
  Common Labrador 149
Thimbleberry 120
Thorny Buffalo-berry 141
Twin-flower 160
Twining Honeysuckle 162

V

Vaccinium
  caespitosum 156
  membranaceum 154
  myrtilloides 156
  myrtillus 155
  scoparium 157
  vitis-idaea
    ssp. minus 157
Velvet-fruited Willow 67
Viburnum
  edule 167
  opulus
    ssp. trilobum 168

W

Water Birch 84
Western Cottonwood 36
Western Mountain Ash 124
White Birch 84
White Dryad 107, 108
White Meadowsweet 127
White Spruce 25
White-flowered Rhododendron 151
Wild Black Currant 95
Wild Gooseberry 100
Wild Red Currant 96
Wild Red Raspberry 119
Wild Rose
  Common 116
Willow 60, 70, 78
  Arctic 63
  Autumn 77
  Balsam 71
  Barratt 52
  Basket 73
  Beaked 54
  Blueberry 68
  Bog 70
  Diamond 74
  Drummond 57
  Flat-leaved 73
  Hoary 55
  Mountain 65
  Myrtle-leaved 68
  Peach-leaved 50
  Sand 59
  Scouler's 75
  Shining 64
  Short-capsuled 62
  Shrubby 62
  Smooth 61
  Velvet-fruited 67
  Wolf 138
  Yellow 65
Winter Fat 90
Wolf Willow 138
Wolfberry 165
Wormwood
  Linear-leaved 170

Y

Yellow Dryad 107
Yellow Willow 65

Glossary

abaxial:	On the side away from the axis.
achene:	A small dry, indehiscent, 1-seeded fruit with a thin wall.
acuminate:	Gradually tapered to a long, slender point.
adaxial:	Turned toward the axis.
adnate:	An organ totally united to another (without joints).
alternate:	Situated singly (not opposite) on a stem, or placed regularly between organs of another kind (stamens alternate with sepals).
ament:	A dense spike or raceme with small, naked or apetalous, mostly unisexual flowers; catkin.
androecium:	Stamens considered collectively.
angiosperm:	Flowering plants (*Magnoliophyta*), containing ovules enclosed in an ovary.
anther:	Pollen-bearing part of a stamen, usually consisting of 2 pollen sacs and connecting tissue.
anthesis:	The time of full flower expansion and functioning of reproductive structures.
apetalous:	Lacking petals.
aphyllopodic:	Lowest leaves reduced, scale-like, the first true blades appearing well above the plant base.
appressed:	Lying flat against another organ.
aquatic:	Living in water.
areolae:	Small, defined areas on a surface.
articulate:	Jointed, the joint the point of ultimate separation.
ascending:	Sloping upward at an oblique angle.
auricles:	Small, ear-shaped appendages such as those at the base of a leaf.
awl-shaped:	Gradually tapering from the base to a slender rigid point.
awn:	A bristle-like, usually terminal appendage.
axil:	The upper angle formed by a leaf or petiole with the stem.
axillary:	Situated in or arising from an axil.
banner:	The upper, usually enlarged petal in a papilionaceous flower.
barbed:	Having short, stiff, pointed, bristly, often reflexed hairs.
basal:	Located at the base of an organ or plant.
beak:	An elongated, usually slender tip on organs such as fruits or seeds; not applied to flat organs (leaves).
berry:	A fleshy or pulpy fruit formed from a single pistil, having 1-many seeds, a fleshy ovary wall and a thin outer skin.
bidentate:	Cleft so that two teeth result.

biennial:	Plants completing their life cycle in two years, usually only flowering in the second year.
bilabiate:	Two-lipped (applied to perianth segments).
blade:	The flat, expanded part of a leaf or petal.
bract:	A reduced/modified scale or leaf subtending a flower or flower cluster.
bractlet, bracteole:	A very small bract; bracts borne on a petiole instead of subtending it.
bud:	An undeveloped flower, leaf or stem, vegetative buds usually covered by small modified leaves (bud scales).
bulb:	A short, thick underground bulb covered by fleshy modified leaves or leaf bases functioning as food storage organs.
bulblet:	A small new bulb arising beside a parent bulb; also refers to structures produced by some plants in axils, sometimes replacing flowers, functioning as a vegetative reproductive structure.
caespitose:	Densely tufted plants.
calcareous:	Lime-rich (calcium carbonate).
callus:	A firm thickening, as on the base of lemmas in grasses.
calyculate:	Having a set of small bracts around the calyx, or in *Compositae*, around the involucre, giving the appearance of an outer calyx.
calyx:	Referring to the sepals collectively.
capsule:	A dry, dehiscent fruit composed of more than 1 carpel (compound ovary).
carinate:	Keeled.
carpel:	The fertile unit of an angiosperm having stigma, style and ovary. Pistils are composed of 1-several carpels.
caryopsis:	The fruit of grasses, with the pericarp adnate to the seed (unlike achenes).
catkin:	See ament.
caudex:	A short, vertical, thick and sometimes woody stem base of perennial herbs, at or just below soil surface. Produces new annual growth, and can surmount a taproot or rhizome.
caulescent:	Leafy stems, with evident internodes.
cauline:	Situated on or pertaining to a stem.
chaff:	Thin, dry scales, as in bracts in composite flowers.
ciliate:	With a fringe of marginal hairs.
clasping (leaves):	The base partially or completely surrounding the stem.
claw:	Narrowed, stalk-like base of a petal or sepal.
cleft:	Divided to about the middle ("lobed" meaning more shallowly divided, "parted" more so).
cleistogamous (flower):	Setting seed without opening.
climax plants:	The original, stable vegetative community that develops throughout time on a specific soil and specific climate.
collar:	The band at the outer side of a grass leaf at the junction of sheath and blade.

colonial:	Plants forming colonies, connected underground by rhizomes.
complete (flowers):	Having calyx, corolla, and functional male and female organs (androecium and gynoecium).
compound leaf:	Composed of two or more distinct leaflets.
cone:	Sporophylls or ovuliferous scales clustered on an axis.
conical:	Cone-shaped.
connate:	Grown together or attached.
connective:	The tissue connecting two pollen sacs of an anther.
connivent:	Converging, but organs not actually united.
continuous (collar):	Extending from one sheath margin to the other.
cordate:	Heart-shaped, the apex pointed, the base rounded.
corm:	A short, vertical, thickened underground stem, functioning in food storage (more solid and without thickened leaves as in bulbs).
corolla:	Referring to the petals collectively.
corona:	Modified portions of the corolla or androecium appearing as small appendages between the corolla and androecium.
corymb:	A flat-topped inflorescence with outer pedicels progressively lengthened, the marginal flowers blooming first.
corymbose:	Arranged in a corymb.
cotyledon:	A leaf of an embryo of a seed.
creeping:	Growing along or below the ground surface and rooting at the nodes.
crenate:	Toothed with rounded teeth.
crested:	Having a projection or appendage on the summit.
crisped:	Irregularly wavy/curled (referring to leaf margins, hairs).
crown:	The base of a herbaceous perennial from which both roots and leafy growth are produced; the appendages in corolla throat; the leafy top of a tree.
cruciform:	Cross-shaped.
culm:	The stem of grasses, sedges and rushes.
cuneate:	Wedge-shaped.
cyme:	A flat-topped or convex inflorescence with the terminal (central) flower of each cluster blooming first.
deciduous:	Falling away at the completion of its function at the end of the season.
declined:	Obliquely curved downward.
decurrent:	Wings or margins (usually of leaves) extending down and adnate to the axis below the point of insertion.
deflexed:	Abruptly bent downward.
dehiscent:	Opening at maturity along a definite line.
digitate:	A compound leaf with leaflets arranged finger-like, radiating from a single attachment point.
dioecious:	Unisexual, the male and female reproductive structures on separate plants.

disarticulating:	Separating at a joint.
disc:	Generally, the enlarged flower receptacle; in composites, the central portion of a head, having tubular flowers.
discoid:	Resembling a head; in composites, referring to heads containing only tubular flowers.
dissected:	Deeply divided (below the middle) into narrow and usually several segments.
distichous:	In two vertical rows.
distinct:	Not united with adjacent similar organs.
divaricate:	Widely spreading and divergent from the axis.
divided:	Cleft to or below the midrib; in grasses, refers to collars separated by the midrib.
dorsal:	Referring to the back or outer surface of an organ; abaxial.
drupe:	Fruits similar to berries, having a fleshy middle ovary wall and thin outer skin but differing in that the inner ovary wall is hardened and bony (stone) enclosing 1-2 seeds.
druplet:	A small drupe (i.e. raspberry), usually one of a cluster.
early successional:	Pioneer plant species that are the first to establish on a disturbed site. These are native species usually also present in the climax vegetation, but decline in prominence as the natural plant succession allows climax species to establish.
emarginate:	With a small notch at the apex.
epigynous:	Perianth and stamens attached to the top of the ovary.
equitant:	Having edges rather than the surface facing the stem.
evergreen:	Leaves that remain green and attached throughout the winter.
excurrent:	The central axis continuing through and exserted as a short point.
exserted:	Extending beyond the surrounding organs.
farinose:	Covered with a white-mealy powder.
fascicle:	Arranged in a close cluster, usually referring to like organs.
fertile:	Capable of producing viable spores or seed.
fibrillose:	Having many slender fibers; shredded because of disintegration of thin tissue between persistent veins.
filament:	The lower stalk-like portion of a stamen.
filiform:	Very narrow and fine.
flaccid:	Weak and lax, not able to support its own weight.
fleshy:	Thickened and succulent, juicy.
floret:	A small flower, often one of a larger cluster as in grasses or composites.
follicle:	A dry pod-like fruit derived from a single carpel, splitting along the ventral side.

forage value:	The worth of a plant for ungulates depending upon a number of factors in combination: nutritional quality, palatability, quantity of forage produced, longevity, and primary distribution patterns. Forage value of a given species can vary from one location to the next, also depends upon class of livestock using the plants and season of use.
forbs:	Primarily broad-leaved flowering plants with net-like veins. For the purposes of simplifying identification, the category can be broadened to include those parallel-veined plants with brightly colored flowers (orchids, lilies, etc.).
gamopetalous:	Petals connate towards the base.
gametophyte:	The generation having "n" chromosomes and produces reproductive structures (gametes). Gametophytes in angiosperms are the embryo sac and pollen grain.
gibbous:	Abruptly swollen on one side, typically at the base of perianth.
glabrous:	Lacking hairs.
gland:	Small secreting structures either protruding, stalked or depressed, producing volatile oils or nectar which is often greasy or sticky.
glandular:	Having glands.
glaucous:	Covered with a fine waxy powder giving a white or bluish color.
glomerules:	Densely compacted clusters or heads.
glume:	One of the two empty (flowerless) bracts subtending a grass spikelet.
grain:	The fruit of grasses. See caryopsis.
grasses:	Plants which have hollow, jointed stems and leaves in two rows (ranks). Flowers are usually perfect, seeds borne between two scales (palea and lemma).
grass-like:	Plants that have narrow, parallel-veined leaves and resemble grasses. Stems are solid, often triangular and not jointed. The group includes, primarily, the sedge and rush families, and strictly speaking, can also include other monocots such as arrow-grass, lilies, etc.
grazing response:	The reaction of a plant species when it is grazed. This overall response varies also with soil, climate and habitat. The following groups are recognized: I. **Invader:** Primarily non-native plants which invade and replace the existing vegetation when it dies back, shows reduced vigor, or is eliminated due to disturbance and overgrazing. These species may or may not have grazing value. II. **Decreaser:** Plants that are major components of the original climax vegetation community. They tend to be highly productive but decline under heavy grazing pressure in prominence and vigor due to high palatability and often inferior reproductive capacity. III. **Increaser:** Native plants that increase in prominence and vigor and replace decreaser species when they decline. They tend to be less productive, less palatable, and often have superior reproductive adaptations. IV. **Increaser #1:** This includes a group of plants that usually increase on rangelands with moderately heavy grazing pressure, but with abuse and severe conditions, will ultimately decline and be replaced by more aggressive increaser species and non-natives.

gynoecium:	Carpels of a flower collectively.
habit:	The general appearance, growth manner and form of a plant.
habitat:	Natural environmental conditions and place in which a plant naturally occurs.
head:	A dense, compact inflorescence on a short receptacle or axis, strictly speaking, a racemose arrangement.
herb:	Annual to perennial plants with the above ground portion dying back to ground level at the end of each growing season.
herbaceous:	A herb, also referring to a leaf-like texture and color.
hermaphroditic:	A flower containing both sexes.
homosporous:	Producing only one type of spore, these becoming gametophytes that produce both male and female structures.
hyaline:	Pale, nearly transparent.
hypanthium:	The ring around the ovary (receptacle) formed by the lower perianth parts and androecium (this marginal), varying from saucer, cup, or tubular-shaped.
hypogynous:	Perianth and stamens attached to receptacle.
immersed:	Growing entirely under water.
imperfect:	Flowers lacking either stamens or pistils.
included:	Contained within, not projecting beyond other surrounding organs.
indicator species:	Plant species that reveal something about site or environmental traits or conditions. Includes references to range condition (high cover of rough fescue indicates good condition) and ecosite type (cloudberry indicates acidic bog ecosites).
inferior (ovary):	An epigynous flower, having the flower parts attached to a hypanthium that projects above the ovary.
inflorescence:	Referring to the type of flower arrangement on an axis; more generally, means flower cluster.
innovation:	A vegetative shoot arising from the base of a main stem.
internode:	The portion of stem between two adjacent nodes.
introduced plants:	Plants brought into an Ecoregion that were not part of the original population. These are primarily species not native to North America.
involucre:	A set of bracts subtending a flower cluster.
involute:	Having the margins rolled inward, concealing (or partially so) the upper (ventral) surface.
irregular (flower):	Having like organs (petals or sepals) dissimilar.
keel:	A sharp longitudinal ridge, as on some grass blades, some sepals etc.; the lower two united petals in most *Leguminosae*.
lacerate:	Having the margins irregularly and sharply torn.
lanceolate:	Lance-shaped, similar to ovate (widest below middle and tapering above) but narrower, generally several times longer than broad. Base from narrowed to broader-rounded.
lateral:	Referring to the sides rather than base or apex.

latex:	The milky liquid produced by some plants containing particles of terpenes (hydrocarbons in volatile oils).
leaflet:	A single unit of a compound leaf.
legume:	Generally, refers to any plant in *Leguminosae*; also, the fruit of members of this family, consisting of a dry pod originating from a single carpel, dehiscent along two longitudinal sutures.
lemma:	The lower and usually larger of two bracts subtending each flower in *Gramineae*. Lemmas sterile or without palea in some species.
lenticels:	The small, raised spots on bark, consisting of loosely organized, mostly unsuberized cells.
ligule:	In *Compositae*, refers to the strap-shaped ray flowers; in grasses and sedges, the small thin appendage projecting from the inner leaf surface at the junction of sheath and blade.
limb:	The expanded part of a leaf or corolla, specifically, in gamopetalous corollas.
linear:	Having a very long, narrow shape, the sides essentially parallel.
lip:	One of the two main segments in a bilabiate (two-lipped) corolla; the upper (apparently lower) petal in orchids.
loment:	The fruit of some legumes in which the pod is constricted and jointed between 1-seeded segments.
lyrate:	Pinnate, the terminal lobe considerably larger, often rounded.
megaspore:	Larger spores which become the female gametophyte.
membranous:	Thin and soft, flexible, often transluscent.
microspore:	The small spores that give rise to the male gametophyte.
midrib:	The central vein.
moisture regimes:	The amount of moisture available for plant growth. Influenced by such factors as soil texture (internal drainage), slope (external drainage) total amounts of precipitation, topographic position, soil surface conditions. The following are recognized: • **Veryxeric:** Water removal very rapid; soils dry most of the time following precipitation. • **Xeric:** Water removal rapid, soil moist for brief periods following precipitation. • **Subxeric:** Water removed rapidly following precipitation, but soil moisture persisting somewhat longer than in xeric conditions. • **Submesic:** Water removal moderately fast following precipitation, available for short periods following precipitation. • **Mesic:** Moderate water removal following precipitation, soil moisture generally persisting for moderate periods of time. • **Subhygric:** Water removal slow enough to prevent drying for extended periods during the growing season; precipitation and discharge water sources. • **Hygric:** Soil moist for the majority of the growing season; permanent discharge areas.

- **Subhydric:** Soils wet to an extent that permanent water table is near the surface most of the year; discharge also likely.
- **Hydric:** Saturated conditions, water removal so slow that water table is permanently at the soil surface.

montane:	Located on the lower slopes of the mountains.
muriform:	Arranged like rows of bricks.
muskeg:	A sphagnum peatland with associated woody species such as *Larix laricina*, and especially *Picea mariana*.
mycorrhizal:	Having symbiotic fungus associated.
naked:	Lacking structures normally present on other like organs (i.e. naked buds lack scales).
native plants:	Plants that were originally present in a given plant community or Ecoregion; more broadly, plants native to North America.
nectary:	A gland that secretes nectar, usually located on a flower.
nerve:	A prominent vein (usually longitudinal) on an organ.
neutral:	A flower having neither stamens nor pistils.
node:	The point of attachment on a stem from which leaves, branches, and in some cases roots arise.
nodulose:	Having minute knobs.
nut:	A dry, indehiscent fruit with a hard wall, usually 1-seeded. Larger and harder than an achene.
nutlet:	A small nut; achene-like but hard-walled.
obcordate:	Heart-shaped but inverted, the point at the base.
oblanceolate:	Elongated and narrowed at both ends like lanceolate, but with the broadest part at or above the middle.
oblique:	Slanting and with unequal, varying widths.
oblong:	Elongate-rectangular, having sides more or less parallel, the base and apex rounded.
obovate:	Similar to ovate, but with the broadest part above the middle, the base cuneate, the apex broadly acute.
obsolete:	Essentially lacking, also refers to structures reduced such that they are barely detectable.
ocreae:	A sheath, derived from the stipule that surrounds the stem just above the leaf base.
opposite:	Situated directly across from each other at a node; placed directly in front of rather than beside (alternate) another organ (i.e. stamens opposite sepals).
oval:	Broadly elliptical.
ovary:	Part of the pistil or carpel containing the ovules.
ovate:	Similar to oval, but broadest below the middle.

palea:	The upper of the two bracts enclosing each flower in *Gramineae*. Absent in some species.
palmate:	Having 3-several nerves, branches, lobes or leaflets arising and radiating from one point.
panicle:	A branched (compound raceme) cluster of stalked flowers, with lowest branches longer and flowering first.
papilionaceous:	Flower with banner petal, 2 wing petals and 2 partly joined keel petals.
papillose:	Covered with minute, rounded-blunt projections (papillae).
pappus:	The modified calyx at the apex of the ovary and remaining attached to the achene, most commonly seen in many *Compositae*.
parasite (in botany):	A plant deriving its nutrients from another plant to which it is attached.
parted:	Deeply cut, from ½ way to near the base of midvein.
pedicel:	Stalk of individual flower.
pedicellate:	Borne on a pedicel.
peduncle:	Flower stalk or stalk of an inflorescence.
perennial:	A plant (or part) that lives more than two years.
perfect:	Flowers with both androecium and gynoecium, with or without perianth.
perianth:	All the sepals and petals collectively.
pericarp:	The wall of a fruit.
perigynium:	The sac-like bract enclosing the achene in *Carex*.
perigynous:	Perianth and stamens united below ovary.
persistent:	Remaining attached after normal function has been completed.
petal:	A member of the internal floral ring (corolla), often showy to attract pollinators, absent in some species.
petiole:	A leaf stalk.
phyllopodic:	Having lowest leaves with well developed blades rather than reduced and scale-like.
pinnae:	The primary segments in a pinnate leaf.
pinnate:	A compound leaf with leaflets arranged on both sides of an elongate axis.
pistil:	The female organ or gynoecium (includes stigma, style, ovary) of a flower, composed of one or more fused carpels, the number of carpels often evidenced by number of locules, placentae, stigmas or styles.
pistillate (flower):	A flower having pistil(s) only and no stamens.
pod:	Generally referring to any dry, dehiscent fruit.
pollen:	The pollen grains, or male gametophytes appearing as a yellow powder on the anthers.
pome:	A fruit from an inferior ovary, with a fleshy outer layer composed of the ripened ovary as well as including ripened receptacle and calyx. The inner papery or bony endocarp encloses the seeds.

prickle:	A spiny outgrowth from the epidermis.
primocane:	First-year canes in *Rubus*. Second year, reproductive canes referred to as floricanes.
pubescent:	Having hairs present, referring to all types of hairs.
pulvinus:	Cushion-like; also, a swelling at the base, such as on a leafstalk.
raceme:	An elongate unbranched inflorescence, of stalked flowers along a common axis.
rachilla:	The axis of the spikelets in grasses and some sedges.
rachis:	The main or central axis as in a compound leaf or raceme or spike.
radiate:	In *Compositae*, having ray flowers.
ray:	The ligule or ligulate flower in *Compositae*; a branch of some types of inflorescence, i.e. of an umbel.
receptacle:	The end of the stem (pedicel) to which the flower parts are attached; in *Compositae*, the end of the peduncle to which the flower head adheres.
recurved:	Abruptly bent backward.
regular:	Having all members of each organ type (petals, sepals etc.) similar in size, shape and orientation.
reticulate:	Forming a network of veins.
retrorse:	Directed downward or backward.
retuse:	With a small notch, on a rounded leaf.
rhizome/rhizomatous:	Having rhizomes.
rhizome/rootstock:	An underground stem, horizontal to ascending, elongating and producing shoots and roots at intervals.
rib:	A prominent longitudinal vein.
roseate:	In the form of a rosette.
rosette:	A circular arrangement of like organs (i.e. leaves), often basal.
rudimentary:	Imperfectly and poorly developed but usually visible with close observation.
rugose (rugulose):	Wrinkled.
runner:	A slender, elongate prostrate stem or branch, rooting at the nodes; similar to stolon, but more slender.
salverform:	Corollas with a slender tube and abruptly spreading into a limb.
samara:	A dry, indehiscent, mostly 1-seeded fruit.
scabrous:	Roughened.
scale:	Generally applied to any small, thin, flat structure (i.e. the floral bracts in *Salix*).
scapose:	With flowers on a leafless stalk (scape).
scarious:	Thin, dry, pale, not green (like hyaline but less transparent).
sepal:	The outer (sometimes only) floral ring, collectively called the calyx. Only rarely are sepals considered absent and petals present.

septate:	Divided into partitions.
sericeous:	Hairs that tend to be long, appressed, silky.
sessile:	Stalkless.
setae:	Bristles.
setose:	Beset with bristles.
sheath:	The lower part of a leaf blade that clasps and encloses the stem.
shrub:	A woody plant, mostly less than 5 m. tall and usually with several stems.
silicle:	Essentially a silique, but short.
simple:	In leaves, the leaf all in one piece although it can be variously divided; in pistils, only having a single carpel.
smooth:	Lacking both any roughness and also pubescence.
soil orders:	Major groups of soils, varying in amount of horizon development, and each developed under specific vegetation and moisture conditions. • **Brunisolic:** Developed under a wide variety of conditions, less developed horizons than luvisols, often lacking AE, but more developed than regosols. Often iron-rich and reddish. • **Chernozemic:** Well developed horizons, the surface or topsoil darkened by decomposed organic matter; developed under grasslands. • **Gleysolic:** Soils developed under wet, waterlogged conditions. • **Luvisolic:** Soils developed under forest or forest/grassland transition, with the evidence of clay movement from the A to B horizon. • **Organic:** Soils developed from deep accumulations (more than 40-60 cm. deep) of decaying organic matter, sedges, moss and peat. • **Regosolic:** Little or no horizon development, or A and B horizons very weakly developed. • **Solonetzic:** Sodium-enriched soil, with a very hard B horizon, saline soils.
sorus (sori):	A cluster of sporangia.
spathe:	A large solitary floral bract, subtending an inflorescence.
spike:	An inflorescence with sessile (subsessile) flowers on an elongated axis.
spikelet:	In *Gramineae*, the small unit of a flower, usually consisting of 2 glumes, palea and lemma, male and female reproductive structures; more generally, any small spike.
spine:	Strictly speaking, a sharp-pointed, stiff structure, considered to be a modified leaf or stipule; generally, any structure appearing as a spine.
spore:	A reproductive body, one-celled and without an embryo (as in ferns); in angiosperms, the first cell of the gametophyte (n) generation.
spur:	A hollow extension (appendage) from the calyx or corolla.
squarrose:	Abruptly curved-spreading from some point above the middle (i.e. in awns of some grasses).

stamen:	The microsporophyll in an angiosperm (male organ) consisting of an anther and filament, producing pollen.
staminate:	Flowers having stamens but no pistils.
standard:	The banner, the large upper petal in papilionaceous flowers (i.e. legumes).
stellate:	Star-shaped, often referring to hairs.
sterile:	A plant that does not produce spores or seed.
stigma:	The portion of the style capable of receiving pollen, usually terminal.
stipitate:	Having a stipe or stalk.
stipulate:	Having stipules.
stipule:	One or two small appendages often present at the base of a leaf petiole.
stolon:	An elongate, creeping stem that roots at the nodes or apex, producing new plants. Usually not used for similar structures that are produced below the ground surface.
stoloniferous:	Producing stolons.
strict:	Straight and upright, not spreading or lax.
strobilus:	A cluster of scales forming a cone.
style:	The part of a pistil connecting stigma and ovary.
stylopodium:	The enlarged, disc-like expansion at the base of a style (common in *Umbelliferae*).
sub:	A prefix meaning almost/not quite, or beneath.
succulent:	Fleshy and juicy from the accumulation of water in the tissues.
sucker:	A shoot originating from below the soil surface.
superior (ovary):	Attached to the centre or summit of the receptacle, above other flower parts and free from them (can be hypogynous or perigynous).
taproot:	A prominent vertical root, thickened upward.
taxon:	A taxonomic entity (pl. taxa).
tendril:	A modified stem or leaf, slender and coiling-twining, enabling a plant to support itself on other vegetation or structures.
terete:	Rounded, not flattened in cross-section.
testa:	A seed coat, originating from the integuments of an ovule.
thallus (thallois):	Plant material without clear definition of leaves, stems etc.
thorn:	Strictly speaking, a modified stem, rather short, stiff, sharp-pointed, stouter than bristles or prickles or spines.
throat:	The junction of the tube and limb of a corolla.
tomentose:	Having a tomentum, or hairs that are woolly, tangled, matted.
torulose:	Cylindric, and having swollen structures at certain intervals.
trailing:	Prostrate but not rooting.
tree:	A woody plant mostly over 5 m. tall, mostly with single stems.

truncate:	Having the base or apex abruptly and transversely straight, as if cut off.
tuber:	Strictly speaking, a thickened part of a rhizome, functioning in food storage and also often in reproduction.
tubercle:	A small, rounded projection or swelling, in some *Cyperaceae*, the swollen, persistent style base.
tubular:	A tube-shaped corolla, with little expansion upward.
turbinate:	Top-shaped.
turion:	A small, bulb-like offset, seen in some species of *Epilobium*.
umbel:	A flower cluster (strictly speaking, a raceme) where all pedicels arise from a common point. A compound umbel has main branches again umbellately branched.
umbo:	A rounded elevation or protuberance on an organ (i.e. on the scales of pine cones).
undulate:	Wavy.
unisexual:	Imperfect, flowers with just stamens or ovaries, not both.
utricle:	A small, thin-walled, 1-seeded, somewhat inflated fruit.
valvate:	Having margins meeting but not overlapping, opening by valves.
valve:	One of the portions of the pod wall into which a capsule separates at maturity.
vein:	A vascular bundle.
venation:	Arrangement pattern of veins.
ventral:	The inside surface, the surface (adaxial) facing the axis.
verticil:	A whorl.
villose:	Hairs that are long, soft, kinky but not matted (as in tomentose).
viscid:	Sticky, greasy or glutinous.
whorl:	A group of more than 2 similar structures arising from the same node.
wing:	Any thin, flat, usually membranous expansion on a structure; in *Leguminosae*, one of the two lateral petals.
woolly:	Covered, usually densely so, with long, matted, tangled hairs.

References

Campbell, J.B.; Best, K.F.; Budd, A.C. 1966, 1973. *Ninety-nine Range Forage Plants of the Canadian Prairies.* Ministry of Supply and Services Canada. Publication 964.

Clark, L.J. 1976. *Wild Flowers of the Pacific Northwest.* Gray's Publishing Limited. Sidney, B.C.

Forest Service, U.S. Department of Agriculture. *Range Plant Handbook.*

Hitchcock, C.L., et al. 1955-69. *Vascular Plants of the Pacific Northwest,* Parts 1-5. University of Washington Press. Seattle.

Johnston, Alex. 1987. *Plants and the Blackfoot.* Lethbridge Historical Society. City of Lethbridge, Alberta.

Kingsbury, J.M. 1964. *Poisonous Plants of the United States and Canada.* Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Looman, J. 1983. *111 Range and Forage Plants of the Canadian Prairies.* Research Branch, Agriculture Canada. Publication 1751.

Moss, E.H. 1983. *Flora of Alberta,* 2nd edition, revised by J.G. Packer. University of Toronto Press. Toronto, Ontario.

Scoggan, H.J. 1978-79. *The Flora of Canada.* National Museum of Natural Sciences Publications in Botany No. 7 (1-4). National Museums of Canada. Ottawa, Ontario.

Viereck, L.A. and Little, E.L. 1972. *Alaska Trees and Shrubs.* Agriculture Handbook No. 410. U.S. Department of Agriculture, Forest Service. Washington, D.C.

Willard, Terry. 1992. *Edible and Medicinal Plants of the Rocky Mountains and Neighbouring Territories.* Wild Rose College of Natural Healing Ltd. Calgary, Alberta.

7 78753 06160 8

Printed in Canada